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WESTERN INDIA

A REGIONAL GEOGRAPHY

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To
My Parents



Author's Note

This regional study of "Western India" may be considered as a preliminary report on those conditions of the Province that have evolved the present pattern of its surface. It examines, first, those physical conditions which govern the natural landscape, and then proceeds to portray the complex facts of the inter-relationship that exists between the natural factors and the human agency. To claim that it is anything more than an outline survey of a province, which in area is as large as the British Isles themselves, would be to deny the very purpose which this study aims at fulfilling.

The work is intended for those who for one special reason or another are interested in a detailed study of Western India. The Secondary School teacher who has to teach Gujarat, Maharashtra and Karnatak in the pre-Matriculation and Matriculation classes, will find here a more detailed and precise account of the regions he has to teach. The College student, who has now an opportunity of offering Geography for his degree course in our University, will find this book helpful in understanding the regional approach. The civil administrator, the social planner, as well as the field worker in academic research, will find here something new and different from the usual 'District' and 'Taluka' statistics, in gaining a clearer and a more comprehensive idea of the Bombay Province and its neighbouring areas.

The study begins with a general discussion, in the first part, of the factors that have shaped the physical setting of Western India. It is followed, in the second part, by a detailed survey of the regions. In suggesting a classification of Western India into its geographical regions, the division is not based on any *a priori* cause or factor. The whole of Western India has been taken as a geographical unity, although along some borders the limits are mainly administrative. After an initial division of the province into its cultural regions, the detailed classification of regions is based on the dynamic aspects of human geography rather than on such other factors as relief and climate, the local influence of which, though fundamental, is indirect and often masked by the human agency. In some regions like the Charotar of Gujarat, it is the agricultural development that introduces a regional contrast. In the Sahyadries, forests guide the human economy. Along the rail-road route between Bombay and Poona, it is the means of transport, and, to quote an extreme instance, the Ulhas Basin is dominated by the Bombay Metropolis. The regional scheme however is only of a reconnaissance nature and may have to be revised on further research. Bombay Karnatak, the author's 'home region'

receives a detailed treatment. Maharashtra, Gujarat, and Kathiawar follow in succession. The City of Bombay receives a detailed attention while only the broad regional characteristics of other areas have been indicated. In the third part, the main features of economic and administrative geography receive a general treatment, although initially it was hoped to make this part as exhaustive as the second. The chapters on agricultural and industrial geography are necessarily outline sketches. The next one emphasises the need for considering geographical contiguity and space-relations, in administration and economic planning. The final chapter assesses the geographical personality of Western India and the forces which have instilled a vitality in the region. The description in all the three parts is supported by sketch-maps and diagrams, but it is superfluous to add that a fairly large-scale map covering the whole province, such as the one in the Southern Asia Series (scale 1" = 2 M.) published by the Survey of India is indispensable to serious study.

It is perhaps pardonable to mention some of the difficulties that have produced the wide gap that exists between the original plan of this book and its actual presentation in print. A major portion of the manuscript and cartograms was ready on the eve of the Second World War, and quite a substantial part of it was printed during the war. The war produced difficulties in obtaining statistics, specially from the States areas. Government imposed restrictions on the use and reproduction of large-scale maps. The author's own responsibilities in military training created an urgent diversion from his normal work. There were also several difficulties in printing.

The author is thus aware of the several drawbacks in his study. The District Gazetteers, though sixty years old, still continue to be the main source of information. Difficulty was experienced in collecting for the States areas statistical material covering the same period as the one for which the Bombay districts data were obtained. So far there have been hardly any detailed studies relating to the physical or human aspects of the smaller regions of Western India, although the publications of the Gokhale Institute of Politics and Economics, Poona, and of the University School of Economics and Sociology, Bombay, mainly dealing with the economic aspects, offer a very welcome aid to the student of regional conditions in the Poona and Bombay urban areas. Almost all the regions of Western India still await systematic research, especially on the side of regional and economic geography. The author's description of these regions, largely drawn from personal observations, is therefore only provisional. Again, one might have wished for a fuller treatment of the urban geography, of soils, agricultural rhythm and ergographs in the chapter on agricultural geography,

and of the distributional aspects of the industries. But soil studies are yet in a state of infancy. Large-scale geological and soil maps are not yet available. A thoroughgoing investigation into land utilization and rhythm of human effort in the agricultural regions is urgent. Industrial as well as agricultural statistics are mostly collected on the basis of the district, a unit too large—for that matter even the taluka—to allow a faithful translation of their distribution on the map. Population, Commerce and Transport have obtained only an indirect reference. And above all, the description has hardly been able to catch up with the rapid political and administrative changes that are taking place today. In a way, this study brings out the gaps in our knowledge of regional conditions in Western India. It is only a preliminary and a tentative survey. The author would consider himself amply rewarded if this attempt served as an impetus to a much more detailed study of the regions of Western India.

It is always a pleasant duty to express one's gratitude to one's teachers and to all those who have helped him in his studies. Prof. C. B. Fawcett and his staff of the University College, London, have initiated him into the subject. The author has had the good fortune of having Professor Armando Menezes as his senior colleague and guide. His association has been both a privilege and an inspiration. Principals Farran, Patwardhan and Correia-Afonso have always been generous in extending facilities in field studies as well as indoor work. The University of Bombay encouraged the field studies by awarding a research grant. The Revenue Department of the Government of Bombay and the Ministers of the States in Western India readily responded to his request for supplying the statistical information. Dr. C. Pichamuthu, Director, Geological Survey of Mysore, was kind enough to go through the chapter on geology and offer many helpful suggestions. Dr. L. A. Ramdas of the India Meteorological Office, Poona, gave all assistance in studying the climatological data. To all these, and to Mr. V. Y. Jathar, Manager, and his staff of the Karnatak Printing Works, Dharwar, and Mr. S. B. Talekar, Artist, who took as much interest in the publication as the author himself, the author expresses his deep gratitude.



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PART I
GENERAL SURVEY



CHAPTER I

Position and Status

✓ In the contact between the East and the West, the Western littoral of India has played a significant rôle. From pre-historic times, the West Coast has had relations with lands beyond the Indian Ocean. The earliest contacts on the basis of commerce, as historical evidence shows, were with Egypt, Phoenicia and Babylon.¹ The expansion of the Mauryan Empire over the mainland of India was accompanied by a corresponding growth in trade with the Greeks between 250 B.C. and 250 A.D. The growth of the Parthian Empire in Persia and the Roman conquest of Egypt in 30 B.C. gave a further stimulus to this trade and brought many West Coast ports into prominence.² Sopara was already famous since the days of trade with Egypt. Pliny (77 A.D.) mentions the port of Chaul, which, according to him, was also a centre of Egyptian trade. This growth in trade, it is interesting to note, effected some changes in the trade routes. In the earliest times, it is possible that traffic may have naturally passed by land across the north-west frontier of the country; about the commencement of the seventh century B.C., regular traffic by sea seems to have sprung up between the Persian Gulf, India and China. ✓ The Egyptian trade route ran across Egypt and Syria down to the mouths of the Twin Rivers and thence took a coasting line to Karachi. ✓ The discovery of the 'monsoon' route to India by Hippalus (47 A.D.), however, opened yet another, and later on more frequented, route to India.³ ✓ Now the Red Sea ports, the coastline of south-west Arabia and the southern Konkan and Malabar became important because of the advantage of the monsoonal winds and the direct approach to the Malabar Coast. Evidently, the close of the S.W. monsoons was a period for the sailing ships to reach the Malabar Coasts and the approach of the N.E. monsoons a favourable time for them to begin their return journey to the Red Sea ports. The trade contacts between Persia and the West Coast

1. Vincent in his *Commerce of the Ancients* (II p. 159) refers to the trade between Western India, East Africa and Arabia; while Vincent assumed that religion prevented the Hindus from undertaking oceanic travel, the existence of Hindu colonies, their commercial connections with East Africa, Arabia and the Persian Gulf, and their influence on early navigation, as seen from the names of vessels, their parts and shipping gear, show that the Hindus were the chief sailors in the Indian Ocean. This has been admitted by travellers like Masudi (920 A.D.) Marco Polo (1290 A.D.) and Ibn Batuta (1340 A.D.)

2. Vincent : *Commerce of the Ancients* ; II p. 86.

3. Caldwell's *Dravidian Grammar* p. 97.

became more intimate with the growth of the Parthian rule in Persia. The Hindu architecture of the period shows the increasing cultural contact for the Western Littoral with the lands beyond the Arabian Sea. The credit of giving the first systematic account of the West Coast ports goes to Ptolemy (135-150 A. D.).⁴ He divides the West Coast into Saurashtra, Lat Desha, Ariake and Damurike, a division which almost conforms to the present cultural zones of the coastal regions. He also mentions many ports, among which Sopara and Chaul were famous, and inland centres of trade like Nasik and Paithan. The Periplus of the Erythrean Sea contains a further account of the West Coast and the nature of trade between India and the Red Sea ports.⁵ The chief articles of export were spices, food grains, silk and cotton cloth, and also precious stones. Wines, metals, glassware, precious metals, gold and silver coins were the main imports. During the succeeding centuries this commercial contact was extended to many Arabian and Persian Gulf ports, and there is a reference by Hieun Tsang (642 A. D.) to the existence of Indian colonies in Persia. Similarly, the Arab writers of the ninth and tenth centuries have left us accounts of the ports of Gujarat, Konkan and Malabar.⁶ Mention is there made of the growing trade with Arabia and Persia, and of a new item of import—the famous horses of Arabastan, which were highly prized by the Indian rulers. The trading community consisted of all classes of indigenous merchants, Hindus, Muslims and Parsees, and of foreign traders who included Jews, Persians, Arabs and Europeans. This commercial and social contact was not only sustained but extended to Europe through the Italian cities during the Muslim rule over this region. Barbosa (1500-1514) mentions the seasonal nature of the trading operations in these ports, which attracted the indigenous and foreign trading communities only during fair weather and were small settlements during the rest of the year. Thus, one finds here an interesting corroboration of Vidal's observation: 'If the land gives man a chance to leave an impression and permanently establish works, the oceans, on the other hand, through a series of conquests reflecting the light of human genius, have opened to him an unlimited power of circulation.'⁷ The Arabian Sea has been, through economic and social forces, a great maker of contacts. The West Coast of India may, accordingly, be truly called the 'Gateway to Western Culture.'

While the contact between the West and the East, in ancient and medieval times, was primarily based on the economic needs of exchange, a new and powerful factor came into play with the arrival of the Portuguese

4. Ptolemy I, xvii.

5. Macrinde's Periplus.

6. Elliot and Dowson : History I; Briggs Ferishta.

7. 'Human Geography'; p. 424.

on the scene. Every progress in oceanic navigation tended to bring the continents of Asia and Europe closer. With the blockading, by the Turks, of the Mediterranean and Red Sea route to India, so highly prized by the Venetian merchants for their European trade, the maritime nations of Western Europe turned their eyes to the Atlantic in search of a new route to the East. The discovery of the New World and of the all-sea trade-route to India was therefore its logical sequel. The favourable orientation of the West Coast regions to the Arabian Sea and its possession of flourishing ports brought this region into early contact with the European

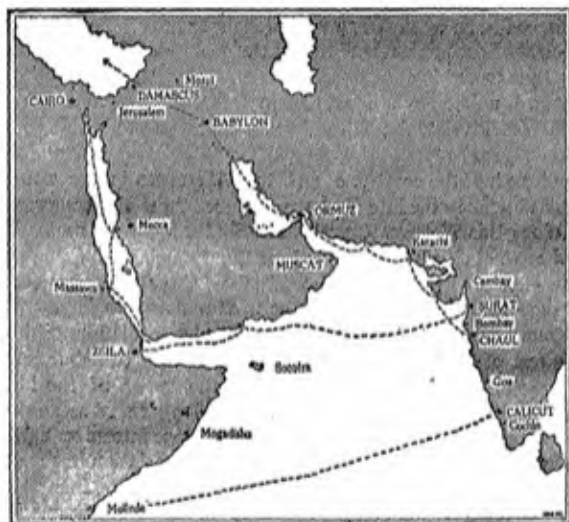


FIG. 1.— Trade Routes of the Arabian Sea: ancient and medieval; Vasco da Gama's route from Melinde to Calicut, 1498.

traders. Thus the Portuguese reached the Malabar coast in 1498 and, later, by breaking the monopoly of the Arab and Egyptian merchants, and in the teeth of opposition from Indian rulers on the mainland, extended their influence to the Konkan and Gujarat by 1530.⁸ Although trade was the chief incentive to their early voyages, religious zeal and naval superiority soon extended Portuguese dominion over the maritime regions of the Eastern hemisphere. Then ensued an era of ambition and rivalry

8. Faria in Kerr's *Voyages* VI.

between the Portuguese, the Dutch, the English and the French. The West Coast of India again figured as a prominent theatre of war. The power of the Dutch and the Portuguese was considerably weakened as a result of naval actions fought off the shores of this region. In two phases of this rivalry, the English first combined with the Dutch to reduce the Portuguese, and subsequently with the Portuguese, who were on the decline, against the Dutch. The establishment of the English factories at Surat, Broach and other ports on this coast shows that the first effective contact of the English with India came via the West Coast. Thus, while the early conquerors of India came mainly through the north-western land approaches to the country, the political influence of Europe, on the other hand, reached India by the oceanic approaches to the West Coast with the development of oceanic navigation and the growth of European sea-power. There is thus something unique about the West Coast regions of India. They formed, unlike any other region in India, the immediate links in the spread of Western thought, culture and political power in this sub-continent of ours.

The length of the coast-line and the differences in the natural and human conditions in the interior have produced three distinct geographical regions along this Western littoral. The Sind is a natural region by itself, moulded by the Indus and delimited by the Baluchistan mountains and the Thar desert. In the south, the Malabar Coast proper, that is, the coastal zone beginning from the northern administrative boundary of the South Kanara District to Cape Comorin, is also a distinct region. The tapering end of the Deccan Peninsula brings the Malabar and Coromandel coasts quite close together, and the relief of the hinterland makes contact easier through its gaps. The long rainy season and the rice-coconut economy make this a region of more intensive agricultural production and a centre of some of the densest population in the country.⁹ These natural factors have been supported by administrative and economic influences during the British rule. The amalgamation of a part of this coastal belt with the Madras Presidency and the growth of communications which now bind the two coasts so intimately, have given this region a cultural and economic orientation that is different from that of its northern neighbour. These facts of natural and human geography distinguish this region from the coastal zone of the North. The land between these two extremities of the coast forms a region by itself and, for reasons discussed elsewhere, possesses a geographical unity of its own. This region is generally known as Western India and has been referred to as such by many writers, past and present, though often the boundaries of the region are only vaguely indicated.

9. For the regional geography of this coast, see G. Kuriyan in *Ind. Geog. Jour.* Vol. XVI, pp. 341-354.

AREA AND BOUNDARIES. The region has an area of nearly 140,000 sq. miles and, by the latest census, a population well over thirty-two millions. It extends from 24° N to 14° N and from 68½° E to 76½° E; it has a length of over 600 miles and a breadth of nearly 175 miles in its widest stretch. The Rann of Cutch marks its north-western limit; along the north and north-east, except in the region of the Palanpur Gap, the Central India highland arc separates it from Rajputana and Malwa. The eastern and southern boundaries, however, are more administrative than natural in character. Along the Deccan Plateau, the administrative boundary separating the Bombay Province from the Central Provinces and the Nizam's Dominions and Madras and Mysore in the south, offers a convenient line to demarcate Western India from its neighbour. It is interesting to note also that the eastern boundary coincides with the climatic transition which shifts the emphasis in agriculture from the Kharif cropping season to that of the Rabi. In the south, on the other hand, the boundary is natural only in the limited sense that it coincides with the Tungabhadra river.

From the physiographical point of view, the northern part of Western India consists of the Cutch 'Island', the Kathiawar Peninsula, the rich plain of Gujarat and the arc of the Central India Highlands. The Satpuras form a continuous barrier along the northern boundary of Khandesh but end abruptly to develop the plain of southern Gujarat. Further south, runs the Sahyadri backbone, which leaves a narrow coastal belt facing the Arabian Sea and develops the Maharashtra and Karnatak tablelands to its east. The human geography of Western India has thus been influenced by coastal belts, alluvial plains and plateau forms. Far more interesting, however, are the details of cultural and administrative divisions. The region resolves itself into four well-marked cultural zones—Kathiawar, Gujarat, Maharashtra and Karnatak. Kathiawar has an area of 36,000 sq. miles; Gujarat, of 28,000 sq. miles; Maharashtra, including Khandesh, covers the largest extent with an area of nearly 50,000 sq. miles; while Karnatak claims the southern portion with an area of 20,000 sq. miles. From the administrative point of view, the distinction between the British Districts and the Indian States is fundamental. Over 35% of the area belongs to the States. Kathiawar and Cutch are almost entirely State territories; in Gujarat, over 60% of the area is occupied by the States, including the leading State of Baroda. In Maharashtra, it is slightly over 20% of the total territory. In Karnatak, about 10% of the area belongs to what are known as the Southern Maratha States. The Portuguese possessions of Western India stand in a category by themselves and occupy an area of nearly 1600 sq. miles.

COMPARISON WITH OTHER REGIONS. A comparison with other regions of India is valuable in that it places this region in a proper pers-

pective in relation to the other parts of the country and to India as a whole. It is perhaps invidious to compare a geographical region with other parts which are primarily administrative divisions. This, however, is inevitable. A regional classification of the country having a measure of scientific precision is yet to be attempted with reference to the geography of our land. Official statistics, which are based entirely on the administrative divisions, do not offer an alternative. Nevertheless, such a comparative survey has its useful side in that it brings out the relative

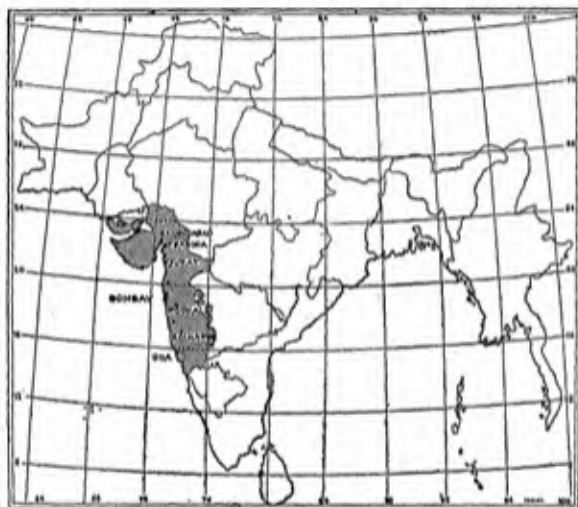


FIG. 2.—Western India: Position and Comparison with other Provinces.

significance of the region under study. Roughly, Western India forms one twelfth of the total area of India, while its population bears almost the same proportion to the total.¹⁰ As a regional unit, it is larger than any other province, Madras coming as a close second. In population, on the other hand, it ranks fifth, among the Provinces of the Indo-Gangetic basin and Madras. Statistics relating to land utilisation are equally interesting, but here again the imperfections of certain States returns have to be borne in mind. If we take into consideration statistics relating only to the province of Bombay—which occupies nearly two thirds of the area—the following comparative aspects are obvious.¹¹

10. Table I.

11. Table II.

The area under cultivation is slightly over 32 m. acres and is almost equal to that in Madras. It is exceeded only in the United Provinces. In proportion of area under cultivation to the total area of the province, the fertile tracts of Bengal and U. P. easily lead the other regions. The cultivated area in the Bombay Province is slightly over 40%; in Madras it is about one third; and in C. P., slightly less than one-third. In area which is classed as "culturable waste other than fallow," Bombay ranks third and is on a par with Bengal. Good scope seems to exist in C. P., the Punjab and Madras for extending the area under cultivation; but in Bombay it is doubtful whether the land so far remaining uncultivated holds great prospects. Although the forest wealth of a region cannot be judged solely with reference to the area classified as forest, it is interesting to know the comparative figures. In Bombay the 'forests' occupy an area of 9 m. acres, which is almost the same as in U. P. The Punjab, C. P. and Madras have a much larger area. It may be seen from the foregoing survey that, both from the physical and the human point of view, we deal, in Western India, with one-twelfth part of the country, a region which is inhabited by a population of over 32 millions and possesses an agricultural area which is nearly 15% of the total agricultural area of the country. ✓ If the quantum of trade and industry is taken into account, the economic importance of this region is still further brought into relief in the comparative study of Indian regions. ✓

POLITICAL EVOLUTION UNDER THE BRITISH RULE. The existence of the four well-known cultural zones under one common form of administration and economic allegiance, requires to be explained with reference to their immediate historical background, which has brought peoples of different languages and cultures within one political orbit. ✓ The Hindu Period (325 B. C.—1300 A.D.) witnessed many kaleidoscopic changes in local authority.¹² The region was a part of the Mauryan Empire (325 B. C.—125 B.C.) till the rise of the Satvahanas in the South, and, a little later, of the Kshatrapas in the North. The Satvahana rule seems to have survived in the southern parts till 210 A.D. The Kshatrapas seem to have ruled Gujarat and Kathiawar up to 300 A.D. The history of the fourth century is obscure, but it is known that, during the succeeding century, the region was ruled over by small dynasties like the Abhiras and the Trikutakas. Kathiawar had a prosperous rule under the Valabhis in the subsequent period. In the Konkan and in Kanara, the Mauryas and the Kadambas were contemporaries. ✓ The next three centuries witnessed a mighty struggle between the Chalukyas and the Rashtrakutas in the South. In Kathiawar and Gujarat, during this period, there was the growth of the

12. A good historical account is available in the Bombay Dist. Gazetteers; See also 'Bombay Administration Report' 1921-22.

Gurjar rule, under which Jainism found its early expansion in this region. The decline of the Chalukyas of Kalyani marked the end of the Hindu Period and, in spite of the attempts of the Devgiri Yadavs to bring about a political cohesion, the campaigns of Allauddin Khilji ushered in the era of Islam. The early Mohammedan campaigns were followed by the setting up of an Islamic political structure which, initially, was of a loose and transitory nature. It was only with the growth of the Bahamani Empire that the new power in the Peninsula found a stable footing. The end of the 15th century saw the disintegration of the Bahamani Empire and the rise of independent Muslim kingdoms in the Deccan. In the next century, there was the extension of the Moghal power towards the south and the rise of the Maratha nation. It was during this period of tripartite contest between the Moghals, the Bahamani kings and the Marathas, that the maritime nations of Europe made their appearance on the Western Coast. The Moghals destroyed the Bahamani kingdoms, but this very act was their undoing. Single-handed, they could not resist the rising power of the Marathas, and it was only a matter of time that the Marathas should inherit the Moghal authority in the Deccan. From the point of view of the present administrative framework, which has so fundamentally influenced the human geography of Western India, the Maratha period constitutes an important landmark. The Marathas, at the height of their power, held sway over the whole of the region except the Portuguese possessions on the immediate coast and the English factory town of Bombay. The Maratha rule, however, was never unified in the sense of having a centralised government organisation. A feudal pattern of administration marked the growing Maratha Confederacy. By the middle of the 18th century, when the Maratha power was at its zenith, the Peshwa ruled Maharashtra, and the rival power of Kolhapur and the Deccan Sardars controlled the southern extensions. In the north, the confederate powers of the Gaikwad, Scindia, Holkar and Bhosala were extending their sway in Central India and the Ganges Basin. Of these, the Gaikwad and Scindia were ruling the territories of Kathiawar, Gujarat and a portion of the Satpuras. But their authority also became feudal and rested on the minor Gurjar, Rajput and Muslim chieftains, the vestiges of the former Rajput and Moghal rule.

✓ The Far-Eastern trade brought the English, like other maritime nations of north-west Europe, to India. ✓ As a maritime nation, they found in Western India a most suitable approach to the country. The coast gave them a good foothold at a time when the Portuguese zealously guarded their trading monopoly. The prevailing political situation made Surat probably the most convenient point to establish a factory (1616). The Gujarat Subha was a well governed part of the Moghal Empire. Moreover, the Portuguese had already appeared on the Kathiawar coast and asserted their naval supremacy against the local rulers in the contest for

Diu.¹³ Similarly, they were powerful on the Konkan and the Malabar coast. The southern Gujarat coast, therefore, was the only possible approach, as this was then the zone of political contact between the Moghals and the Bahamani Kings who were ruling the Deccan Plateau. ✓ The good-will of the Moghals was obtained, and the Surat factory thus paved the way for similar ventures at Ahmedabad, Bombay, Broach and Baroda (1616-1648).

The story of the cession of Bombay by the Portuguese and its subsequent development under the East India Company, is full of interest. As early as in 1625, the Directors of the Company proposed that Bombay should be taken as a factory concession; in 1640, the Surat Council expressed the opinion that Bombay was the most suitable place on the West Coast. With the rising Maratha power on the mainland, they felt their position at Surat most precarious, as the Surat factory had neither the sea nor a mountain wall to protect them from the Marathas. Their strenuous efforts to obtain factory sites during the years 1659-1661 show how keenly the Council had sensed the danger from the mainland. Their anxiety is well reflected in their letter of 7th Dec. 1661 to the Directors, in which they point out the vital need to find a station that would place them out of the reach of the Moghals and the Marathas.¹⁴ It is interesting to note, therefore, that Bombay was primarily chosen for its *isolation* rather than for its advantages as a natural harbour. Indeed, the port was considered as too large by many! The Portuguese, who appreciated the advantage, were naturally reluctant, and not till 1664 was the Island handed over to the English administration.

✓ In the early phase of the English commercial expansion, their progress on the West Coast was slow and risky, but their naval superiority came to their aid. Often the Gujarat ports were blockaded and the Mecca pilgrimage interfered with.¹⁵ This proved effective in bringing the Moghal Viceroy in Gujarat to terms, because the very prosperity of the province depended ✓ on its ports, and Gujarat was the main venue for the pilgrimage to Mecca. Along the Konkan Coast, progress was considerably impeded by many political factors. The Portuguese had their stronghold in Goa and at several minor points in the north. The Siddis of Janjira and the Angrias of Kolaba were local rivals; and the Dutch and the French were still contending with them for the supremacy of the sea. Above all, on the mainland, the Marathas were the rising power.¹⁶

13. Diu was taken in 1531, and retained with supreme effort in 1546; Faria in Kerr's *Voyages*, VI.

14. Bruce's *Annals*, I & II.

15. Thompson and Garratt: *Rise and Fulfilment of British Rule in India*, pp. 9 and 15.

16. Here again, how the Bombay Government tried to help the Siddis as against the Angrias, can be seen from the account of the Maratha Campaigns in the Konkan in 1733; Sardesai, *Marathi Riyasat*, II pp. 273 ff.

Earlier, with the decline of the Bijapur Kingdom on the Deccan mainland and of the Portuguese on the seas, the English could establish their factories in commercial centres like Rajapur and Karwar. Political authority waned all over Western India after the fall of the Moghal Empire, and the land became, for the time being, a scene of turbulent warfare and political change. But in spite of this political instability—and perhaps because of it,—the English factories flourished, for here were available the only spots where commerce had a chance to flourish under more secure conditions and so was specially encouraged by the servants of the Company.¹⁷ This explains the rise of Surat and Bombay during the early days of the East India Company.

The growth of the Maratha Empire on the Deccan Plateau and in Gujarat created a political barrier between the English settlements and their rich hinterland. The Maratha rush towards the coast could be stemmed only by concerted diplomatic action by the Bombay President, often supported by the navy. The English settlements thus emerged almost unscathed during the troublous 18th century when the Marathas threatened them from the land and the French from the sea. But *political* extension was slow and chequered with failures. The need to expand beyond the island limits of Bombay was acute; in 1771, an envoy was sent to Poona with proposals to obtain Salsette and Bassein, but the Marathas refused to cede any land. But soon after, in 1774, Salsette and its dependencies were taken by force. The very next year, this annexation was ratified by the Peshwa rival, Raghunathrao, who agreed to recognise it in return for English help in obtaining the Peshwa leadership.¹⁸ This attempt on the part of the Bombay Government to gain a foothold on the mainland was soon foiled on the conclusion of the Treaty of Purandhar, whereby the English were to surrender the Bassein portion of their new annexations and to abandon the cause of Raghunathrao in his succession dispute at Poona.¹⁹ The Bombay Government, however, pursued its policy of alliance with Raghunathrao and undertook an expedition to establish him at Poona; the disaster of this expedition again illustrated the influence of the relief of the Sahyadries, and brought home the fact that naval power alone was not adequate to subdue a power based on land. Colonel Goddard's retreat in 1781 also shows the difficult nature of conquests undertaken from the West Coast into the Plateau interior. Relief denies an easy access to the Maharashtra Plateau from the Konkan. The nearness of the Poona Court made such attempts doubly difficult. The Treaty of Salbai

17. Cambridge History of India, Vol. V pp. 113-114.

18. Grant Duff: History of the Marathas (Edward's Edn.) 11 p. 55;

19. In 1774, the Bombay Government invaded Salsette and Bassein and occupied these territories and the neighbouring islands of Versova, Karanja, Elephanta and Hog; by the Treaty of Purandhar they had to surrender only Bassein. Forbes: Oriental Memoirs, I p 453

(1782) established peaceful relations with the Marathas for the next twenty years. But not until the disintegration of the Maratha Confederacy, the natural sequence of internal feuds and the success of the Bengal Government in reducing, under Wellesley, the northern Maratha territories, could Bombay venture out in the political struggle in Western India.²⁰

From the point of view of the present administrative framework of Western India, the history of the Maratha power in Gujarat and Kathiawar is very interesting. The Moghal authority ceased to exist in Gujarat after the campaigns of the 1730's and most of the province came under the control of the Gaikwads. The petty local rulers were allowed to rule most of the Kathiawar and Gujarat as before, but they were required to pay annual tribute to the Gaikwad and accept his suzerain status. The Peshwa made his appearance in Gujarat in 1751 and exacted similar privileges, and henceforward a dyarchy ruled these lands.²¹ Succession disputes at Baroda after Damaji Gaikwad's death in 1768, marked the first stage in the defection of the Baroda rulers from the Maratha cause. A treaty of alliance was soon concluded between the Company and the candidate who emerged successful in the succession struggle with the aid of the English.²² These friendly relations gave the Company an opportunity to develop their influence in Gujarat. In 1799, the Gaikwad entered into a subsidiary alliance with the English. On the death of the local Nawab, Surat was annexed in 1800. Broach was taken from the Scindia in 1803. Dholka, Nadiad, Kaira and Chikhli were obtained in 1805. The disputes between the Peshwa Bajirao II and the Gaikwad over territorial possessions and tributes threw the latter into a closer alliance with the Company and, soon after, the Company became arbiter in the disputes between the Gaikwad and his vassal states. From 1807 onwards, the smaller states preferred to develop an alliance with the English in order to obtain security and non-interference from the Gaikwad and the Peshwa. The events of 1817 and 1818 strengthened the political influence of the Company, and the Gujarat and Kathiawar states were soon taken under protection as a part of the general policy of extending the company's rule over Western India. This policy of granting security and privileges under treaties and sanads to Indian States, large and small, was rewarded by the rapid establishment of British influence over the conquered territories, and primarily

20. Wellesley's campaigns in Central India and the Deccan in 1802-03 reduced the power of the confederates, notably the Gaikwad and Holkar. Holkar offered a longer resistance till 1805; *Camb. Hist. of India* V pp 373-75.

21. In 1751, the Peshwa Balaji Bajirao attacked the Gaikwad, who was showing signs of defection, and forced him to accept a treaty whereby he was made to surrender half the Gujarat Revenue and other privileges. *Baroda Gaz.* p. 179.

22. The Treaty of Khandila between Fateh Sing and the Company, of 26th January 1789: *Sardesai, U. V.* pp. 248 ff.

accounts for the 'honeycomb' pattern in administration that obtains in Kathiawar and Gujarat to-day.

In the dominions of the Peshwa, political extension came comparatively late but almost in one enveloping movement. What is more important, it came from the east. Bombay played a subsidiary rôle in the campaigns of the Second Maratha War which were conducted from the Madras and Bengal territories of the Company.²³ The internal decay of Bajirao's court, his weak hold on the empire and his subsequent defeat by the Holkar, contributed to the growth of the Company's diplomatic influence in the Maratha territory. The Treaty of Bassein (1802) was the first major diplomatic success, an event only to be compared with the gain of the Bombay Island from the Portuguese. Although no territorial gains except those of Malwan and Ratnagiri in 1812 were recorded between 1802-1817, the Company secured great influence at the Peshwa's Court and almost assumed the rôle of arbiter between the Peshwa and his confederates.²⁴ Strained relations with the Gaikwad and the murder of his envoy in 1817 led to another treaty with Bajirao II, which firmly established in theory what was already shaping in practice, the increasing importance of the English in the internal affairs of the Marathas²⁵. The year 1818 saw the final extinction of the Peshwa power. The territories of the Peshwa were annexed and consolidated under Elphinstone, to form the major portion of the Bombay Presidency. A small territory between the the Varna and the Nira rivers was allotted to the Raja of Satara, the descendant of the founder of the Maratha Empire. Subordinate rulers in the Maratha Empire were guaranteed the security of their possessions and privileges on their accepting the sovereignty of the Company.

Thus it was only after 1818 that the English obtained their major political annexation in Western India, and minor territorial changes have continued, even up to the present day, to affect its map. Under Dalhousie's Doctrine of Lapse, Satara and some minor S. M. C. states were annexed during 1848-50. Sind, conquered in 1843, was, on grounds of administrative convenience, transferred to the Bombay Presidency in 1847. For the same reason, the Panch Mahals, obtained from the Scindia, were added in 1852. The same considerations persuaded the Government to transfer the North Kanara District from the Madras to the Bombay Presidency in 1865. From this year began the period of steady consolidation and administrative

23. For details of these campaigns which were conducted from the Bengal and Madras sides of the Company's possessions, see Sardesai, U. V. p. 132; and Chaps. 6, 7, 9, 10 & 11.

24. Malwan and Ratnagiri were obtained from the Kolhapur Chatrapaties under the treaty of 1812. Kolhapur Gaz. p. 236.

25. Under this treaty, the Peshwa renounced the Confederacy, had to sever his diplomatic relations with the confederates and surrender the Konkan territory and the Kathiawar tribute to the Company: C. H. I. v 374;

progress of the Bombay Presidency and the States of Western India, a development which was arrested only in 1919 with the introduction of the Mont-ford Reforms. A process of administrative devolution and of the detachment of States, large and small, has since started. The Mont-ford Reforms relieved the Bombay Government from the responsibility of many States, which were placed on a new footing in their relations with the Crown. The Reforms of 1935 have completed this process by placing all the States in direct relation with the Viceroy through the Political Department. Sind, as was to be expected, has become a separate province under the new Constitution.

GEOGRAPHICAL INDIVIDUALITY. The foregoing historical account brings out the influence of those geographical factors that have gone to make up the personality of the region.²⁶ Its north and south extension explains the facts of diversity in relief and land forms, in climate and vegetation, in land use and economic development. The facts of human geography follow the same general trend in diversity. Regional differences of language, differences in elements of culture, and the stamp of historical events have produced the cultural groups of Kathiawar, Gujarat, Maharashtra and Karnatak. Administrative differentiation, in the form of the British Districts, the Indian States and the Portuguese possessions, has also added colour to its geographical setting. Yet, in spite of these regional differences, Western India possesses geographical unity owing to more fundamental influences, past and present, natural and human. Its orientation to the Arabian Sea promoted the contact with the West from the earliest times. The coasting route *via* Karachi was a natural outcome of the configuration of the coastline. With the progress in the art of navigation, monsoonal winds considerably shortened this distance across the Arabian sea by means of a direct route to the Konkan and Malabar Coasts. The gulfs of Cutch and Cambay have strengthened the advantage of the long coastline that the region has relatively to its total area. Coasting trade has promoted contact between its two extremities, the Cutch and Kanara. The agricultural plains of Gujarat have offered a rich hinterland that is easy of access *via* the Cambay ports. Along the Konkan coast, the Plateau hinterland was successfully tapped by piercing the land routes through the Sahyadri Ghats. These advantages of easy communication and favourable approach to the northern parts were naturally followed by commercial contacts and growth in economic interests, which tend to draw the distant parts of Western India together. The economic development of the metropolitan city of Bombay has forged a new bond among the inhabitants of the region. Administrative centralisation in Bombay has also given the city a kind of social hegemony. The spread

26. These aspects receive a detailed consideration in the last chapter.

of education under the aegis of one university tends to consolidate these results by the evolution of certain common ideals which have shaped the region into a distinct regional unit. This unity of interests finds an expression in the manifold activities of the inhabitants. In social and political thought, in economic progress and even in the lighter side of life, this feeling of regional unity asserts itself in the evolution of associations formed on the territorial basis of Western India. ✓The human outlook in this region has been fundamentally influenced by maritime activities, by the commercial expansion of Bombay, the commercial character of agriculture in its richer hinterland and the industrial development of the major cities. This unity of interest has created, in the words of Brunhes, "a psychological bond" that fixes the relations between the phenomenon of physical geography and the facts of material human geography.²⁷ ✓Its orientation to the Arabian Sea differentiates it from its neighbours of the Peninsular interior, the Central Provinces and the Nizam's Dominions; while, on the other hand, its central position on the Deccan Peninsula, as compared with Sind and Kerala, gives it a more intimate touch with the heart of the Peninsula than these extremities of the West Coast. Thus it is clear that this region possesses a well-marked individuality which has been determined by its intrinsic regional conditions as well as by its position and geographical orientation.²⁸

27. Brunhes : Human Geography, p. 599.

28. Geography, Vol. XXII 1937, p. 256; Report of a committee of the Geographical Association on "Classifications of the Regions of the World."

TABLE I

AREA AND POPULATION

	Western India	Madras	Bengal	U. P.	Punjab	C. P. & Berar	Br. India
Area in sq. m. ...	138,795	126,166	77,442	106,247	99,089	98,575	1,584,410
Population ...	32,853,136	49,341,810	60,306,525	55,020,617	40,906,147	16,813,584	388,997,955
Density per sq. m. ...	240	391	779	518	287	170	246
Towns ...	396	407	149	445	202	119	2,703
Villages ...	39,143	35,430	84,213	102,388	35,269	38,985	655,892

TABLE II

LAND UTILIZATION—MAJOR BRITISH PROVINCES

(IN ACRES)

	Bombay	Madras	Bengal	U. P.	Punjab	C. P. & Berar	Br. India
Total area ...	78,893,777	91,021,317	49,254,596	67,848,920	61,001,600	63,972,480	668,061,000
Cultivated ...	32,801,971	32,801,620	23,357,000	35,662,051	2,650,416	24,668,067	226,980,000
Fallow ...	10,717,834	11,165,710	5,424,285	2,910,102	4,619,933	3,988,965	52,299,000
Cultivable waste other than fallow	6,665,952	13,441,825	6,626,134	10,217,742	14,215,656	14,209,925	155,260,000
Not available ...	19,477,464	19,792,886	9,229,308	9,900,572	12,862,386	4,949,650	144,816,000
Forests ...	9,230,546	13,803,814	4,617,869	9,282,068	1,972,000	16,269,342	89,239,000

CHAPTER II

Geology, Relief, and the Arabian Sea

GEOLOGICAL HISTORY. "While the major natural regions of the Earth, as defined by Herbertson, and by later workers, are climatic in character, the most satisfactory basis for the sub-division of these regions depends upon the scientific classification of landforms which, therefore, has an important use in systematic Geography."¹ A survey of the geological past of Western India is valuable from this point of view. It means a study of the *essential* facts of the geological history in so far as these help us to develop a scientific classification of the present landforms of this region. The three-fold division of India into the Deccan Peninsula, the Indo-Gangetic Basin, and the Himalayan arc, termed by the geologists as the Extra-Peninsula, is, as is well known, the starting point in the study of geology and geography of India. These regions of dissimilar past offer a fundamental contrast in their existing structure and landforms. The geological history of Western India may well be stated in the general terms of that of its parent region, the Deccan Peninsula, although local differences demand, in certain parts, a closer attention.

The Deccan Peninsula is one of the most ancient and stable parts of the earth. The first physiographic shape of the Peninsula seems to have been that of a vast plateau, at the northern end of which stood the Aravalli mountains, and beyond them lay the primeval seas.² Subsequently, the plateau became a part of the Gondwanaland that extended, in the Southern Hemisphere, from South America to the Malay Archipelago. The Archaean rocks, possibly originating from the processes of mechanical sedimentation, later folded into great mountain masses and, subsequently denuded to a base level of erosion, form the basal complex of this region. In the main, these are largely characterised by highly metamorphosed rocks—gneisses and schists—with intrusions of granite in many places, which yield a typical landscape. This Archaean system, containing some of the oldest rocks, is associated with another series of rock types which is primarily sedimentary in origin and probably belongs to the same age. These were deposited in the hollows and depressions of the basal complex, and are known as the Dharwar system, famous for their structural and chemical peculiarities as well as their economic importance. These formations were

1. Ogilvie : ' Geography ', Vol. XXIII, p. 75.

2. Holland : Imp. Gaz. of India, Vol. 1, p. 2.

followed by a long period of quiescence—the Eparchaeon Interval—in which there were many cycles of erosion marked by processes of mountain building and peneplanation. The Dharwars of the Peninsula occur as bands of schistose rocks in the gneisses and granites. These can only be considered as remnants of a great formation which must originally have covered a large part of South India, and which have escaped denudation because they form synclinal strips folded in with the gneisses. This Eparchaeon Interval was succeeded by another rock-building era in which the rocks of the Purana group were laid down unconformably over the denuded Archaeon Complex. In contrast to the Dharwar system, which was subject to intense folding as a result of the initial crustal disturbances, these rocks, the Cuddapah and the Vindhyan, were deposited in parallel sedimentary strata. In the subsequent Dravidian Era, the Extra-Peninsula witnessed marine incursions and vast deposition of marine sediments, but the Peninsular land-mass remained undisturbed, and, here portions of the earlier rocks were washed down to the sea and many physiographical changes of an erosional nature took place.

This long period of quiescence came to an end at the commencement of the Upper Carboniferous period, when powerful earth-movements altered the face of the Earth. While the Extra-Peninsular area was invaded by the Tethys, the Peninsula suffered local crustal tension and developed a series of basin-shaped depressions, the result of subsidence of large linear tracts. Into such basins were deposited the rocks of the Gondwana system. The end of this period and the beginning of the Tertiary Era were marked by stupendous changes in the physiography of the land. A new geodynamic activity resulted in the break up of the Gondwanaland, the successive outpourings of lava over a large portion of the Peninsula, and the uplift of the Himalayas from the northern seas. The break up of the Gondwanaland gave the peninsula its present shape and outlines, and the lavas spread in the western portion of the Peninsula in horizontal beds of great thickness, uniformly burying underneath the earlier relief features, to develop the characteristic "Trap" topography of modern times.³ The formation of the Deccan Trap was the last major rock-building episode in the history of the Peninsula. Since then the Peninsular land-mass has remained in an undisturbed state, except in the coastal regions where relative changes in the level have taken place while a long period of denudation has altered the face of the land with development of residual hills and basins and of recent deposits in the shallow depressions, island and coastal. Sub-aerial influences on the Deccan Trap have created Laterite formation on the flanks of the Sahyadries and, in the drier parts of the Trap regions, the famous "Regur" soil. Two

facts, therefore, stand out prominently in the geological history of the region: the stable nature of the fundamental complex, and the local details in geology and relief introduced thereon by regional depositions—sedimentary and eruptive—as well as by the forces of denudation.

GEOLOGY AND GEOMORPHOLOGY. The geology and geomorphology of Western India needs to be studied against this background. (Fig. 3). The *ancient core of crystalline and gneissic rocks* of the Archaean system outcrop in the Southern Zone, in the borderlands that separate Gujarat from Malwa and in Cutch. In the South, most of the gneissic types have undergone considerable denudation, to form the wide and undulating plateau of the Karnatak. In view of the complex character of these rocks, it is not easy to establish a simple and general relationship between them and their surface form. But there appears to be, as Foote observes, a regional contrast between the granitoid and schistose areas.⁴ The granitoid representatives, like the Charnockites, outcrop as small bosses and barren surface, to create a landscape of contrasts: the isolated and disintegrated hill forms surrounded by undulating plains developed on softer strata, as in the south-eastern parts of the Bijapur District. A similar landscape may be seen in the granitoid gneiss area of Khanapur in Belgaum. The schistose areas "differ from the granitoid areas by the much greater smoothness of their surface, for even when they form hills they are in most cases gently rounded in form, and rarely show very rocky surfaces. The slopes of the watershed are, however, greatly cut up and worn into very small rounded hillocks. Few conspicuous hills exist in these schistose districts, and the scenery is anything but commonplace and monotonous. This is in great measure owing to the very scanty vegetation by which the schistose rocks are covered."⁵ Such areas may be particularly observed in the southern parts of Belgaum and Bijapur. The north-east highland arc of Gujarat presents similar features of a gneissic landscape. The *Dharwar system* in Western India is represented by the type area. It occurs in a number of elongated bands, extending from the southern margin of the trap to the Cauvery basin. The system is famous for its immense variation in structure and composition. Harder rocks, like bands of haematite quartzites, have resisted erosion, while the softer schists have developed valley features. The hog backs near Dharwar, underlain by ferruginous quartzites, and the intervening valleys developed on softer chlorite schists, well illustrate this aspect of the morphology of the Dharwar System.⁶ Most of such hill features present poor vegetation

4 Foote: *Memoirs of G. S. I.*, Vol. XXI, pt. 1, p. 41.

5 Foote: p. 48.

6 C. S. Pichamuthu: *Journal of the Mysore Univ.*, Vol III, pt. XIII, p. 95 and 100
Ind. So. Congress, 1940, pt. IV, p. 89; pt. III, p. 9.

cover on account of their thin and infertile soil, and thus offer a landscape of sharp contrasts in this region.

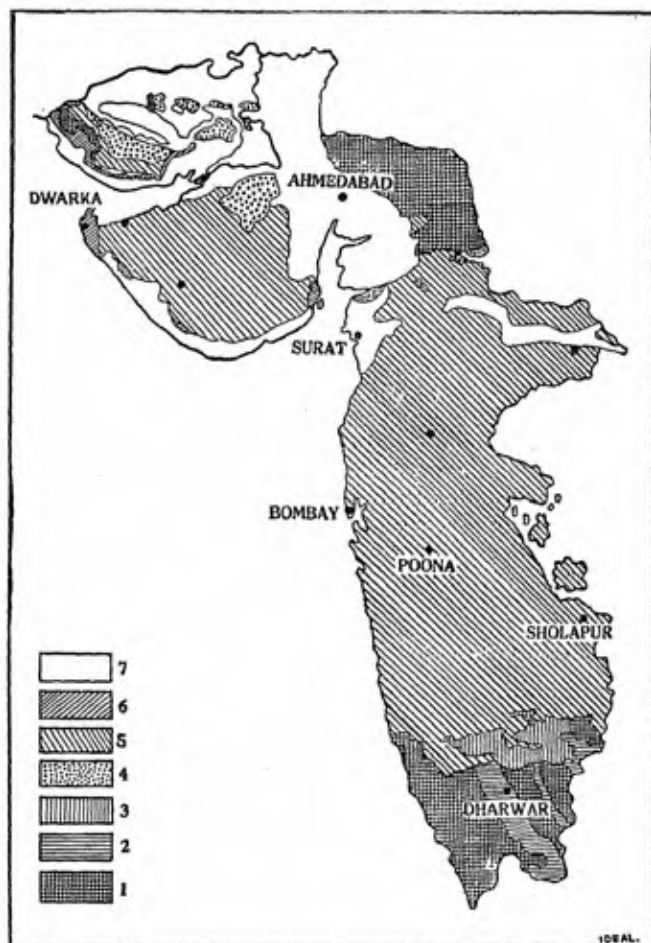


FIG. 3.— Geology.

1. Crystalline Gneiss etc. 2. Dharwar. 3. Cuddappahas. 4. Upper Gondawans
5. Deccan Trap. 6. Upper Tertiary. 7. Recent and sub-recent.

The *Cuddappah system* is represented in Western India by the rocks of the Kaladgi Series. It consists of sedimentary rocks that have undergone partial metamorphism. Quartzites, limestones, shales and breccia are its leading types. These rocks occupy a horizontal position with a general dip to the east, and rest on the basal Archaean Complex. A very long process of denudation has uncovered the harder quartzites and haematite



FIG. 4.— Section (*After Foote*).

N. N.E. — S. S. W. 23 miles, to show the influence of the rocks of the Kaladgi series.
1 Metamorphic. 2. Quartzites. 3. Limestone. 4. Trap.

schists, the dip of the quartzite having given these residual hills a steep escarpment on the west and a gradual slope to the east. The Bhima Series of the Karnatak region is the only representative of the *Vindhyan system* in Western India. These rocks develop a typical limestone and quartzite topography. The Jurassic rocks of Cutch belong to the Gondawana system and with their sandstone and limestone outcrop, yield a dry and barren topography, the effect of which is further exaggerated by the arid climate.

The *Deccan Trap* occupies the largest area in Western India. It extends almost from the southern flanks of the Narmada Valley to the banks of the Krishna. Only in the Tapti Valley is it covered by recent alluvium. It occupies the central and southern Kathiawar and outcrops as a band in the central Cutch. These lava flows occur in horizontal bedded sheets and reach a maximum thickness of 10,000 ft. near Bombay. The

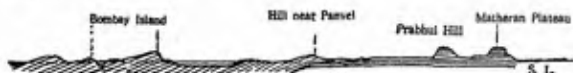


FIG. 5.— Section (*After Blanford*) W. — E. 30 miles, showing the position of the Trap Beds.

weathering peculiarities of these basaltic formations and their almost horizontal position have lent a characteristic landscape to the Deccan trap region. The tendency of the basalts to spheroidal weathering has yielded in many regions a topography marked by rounded weathered masses.⁷ Prismatic jointing, on the other hand, has produced step-like series of escarpment on the hill-sides and the "Ghat" aspect of the western flank

of the Sahyadries,⁸ while horizontal bedding has given the residual hills a uniform crestline and flat tops and the river basins, a graded aspect. How far the composition of the trap rocks has influenced the details of landscape must await further geomorphological investigation in this region. The rocks possess an almost uniform petrological composition in the form of amygdaloidal basalts, but there are variations with the intrusion of acid and ultra-basic types in Kathiawar and Gujarat.⁹ The Deccan lavas show variations in colour and texture. Variations in texture are probably the most important factor that must be associated with the change of local topography. The volcanic ash beds near Poona and the intrusive fissure dykes of a later period have similarly introduced differences in landscape.

Among the latter formations, the *Upper Tertiaries* of Kathiawar and Cutch have exercised a pronounced influence on topography and land utilization. But of greater significance is the extensive development of *laterite* in the southern trap zone. Great variations in composition and weathering qualities make laterite a rock of importance both in the geology and in geography. Under weathering, it develops a poor soil and supports thin scrub. When newly quarried, it is soft and easily dressed into bricks, but on exposure regains its hard and compact character, which explains its great utility as a building stone in localities where it occurs. It is found

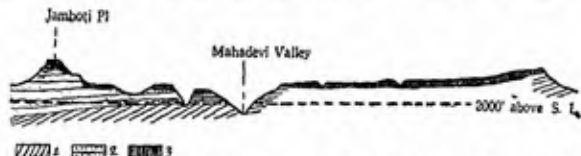


FIG. 6.—Section (After Foote). N. — S. of the Gauli Plateau near Belgaum showing the position of the *high level* laterite.

1. Metamorphic. 2. Deccan Trap. 3. High Level Laterite.

capping the highest flows in the Deccan Traps and varies in thickness from 50 to nearly 200 ft. Its development in Western India can be seen in two belts: it appears as a belt, broken in many places on the southern coast of Kathiawar; on the Plateau, it extends southwards from the Godavari Basin, almost along the Sahyadri crestline.¹⁰ It is not only associated with the Deccan traps, but continues south as a capping on the Dharwar schists. This 'high level' laterite differs from the 'low level' types found extensively in the Konkan coastlands, in that the latter is a product of the mechanical disintegration of the former and is less massive. In both cases,

8. Wadia: p. 195; Blanford: *Memoirs G. S. I.*, Vol. XXI, pt. 2, p. 28.

9. Fedden: *Memoirs of the G. S. I.*, Vol. XXI, pt. 2, p. 28.

10. Fedden: p. 38; Wadia: p. 258.

however, the laterite interests the geographer because of the sharp regional contrast that it introduces, in landscape and land use. Of the recent deposits, the alluvial areas of Kathiawar, Gujarat and the Tapti valley are extensive and, on account of their fertility, have become regions of human concentration. These are regions of deposition, and in south-west Kathiawar and Gujarat rest on an older denuded platform.¹¹ Intense riverine erosion in the interior and deposition of alluvium and sand along the Cambay coast, mark the landscape of these plains. The development of the 'Regur' soil in the plateau tracts of Maharashtra and Karnatak is another noteworthy feature. Finally, a reference may be made to the wind-blown deposits of the *Porbandar Stone* in southern Kathiawar, which on account of its colour, softness, and ease in dressing, has gained an economic importance as building and architectural stone.

PHYSICAL FACTORS GOVERNING THE LANDSCAPE. From the foregoing account it is clear that two dominant influences have determined the physical setting in Western India. The crustal movements and disturbances of the Archæan and Tertiary Periods have created the measure relief forms of the Plateau and the Coastal Plains. The Plateau, the Sahyadris and their subsidiary members and the raised Coastlands of Konkan owe their origin to these forces.¹² The faulted island remnants along the Coast, the faulted features of the Sahyadry flank, and the rift valleys of the Narbada and Tapti are features of detail, illustrating the influence of the same forces. Thus, while major landforms may be explained in terms of hypogene action, the local details in landscape have been determined by forces of denudation. The residual hills of the Plateau, the wide basins of graded streams, the highly dissected appearance of the Western portions of the Sahyadris, are features of erosional geomorphology. Standing in contrast to these, are the features of deposition, the alluvial plains of Gujarat, Kathiawar, the Tapti valley and the estuarine zones of the coastal tract.

RELIEF REGIONS.¹³ The geological structure and the representative landforms afford a suitable basis for a classification of Western India into relief regions.

(i) *The Sahyadries and their transverse members.*—The Sahyadry Range forms in effect the western edge of the Plateau from the littoral

11. Wadia: Field Sciences of India, p. 30.

12. Foote: p. 12.

13. See Proc. of Ind. Sc. Congress Assn. 1941, pt III, p. 71 for a discussion on the 'Physiographic' divisions of India; Pithawala: Journal of Madras Geographical Assn. 1939; Kazi S. Ahmad in Ind. Geog. Jour., Vol. XVI, p. 257. Here physiographic regions have been taken essentially as relief regions.

regions of Konkan. Its fractured edge presents a terraced appearance. This is much in prominence in the Trap Zone of the Range on account of the parallel Lava bands which have developed steps in the process of denudation. The crestline of the Sahyadries is marked by a series of plateau



Fig. 7.—Relief and drainage.

Land over 2000 ft. shaded; 100 ft. contour indicated by dotted line.

tops like those of Mahabaleshwar. But the watershed, in many places, is not coextensive with it, as is the case in the Baglan and Karnatak tract, where the river systems draining the land to the Arabian sea have tapped areas much beyond the crestline. This is probably to be explained by the greater erosive power of the ungraded streams. The Sahyadries have a longitudinal range of 600 miles, extending from the Tapti to the administrative boundary of the Province in the South. In general, this main range has an altitude varying between 2500 and 4500 ft. above sea-level. The northern part of the range records a greater general height and the Saptshring, Tryambak and Mahabaleshwar points, with an average height above 4500 ft., stand out prominently along the watershed. To the south, the watershed loses height, and there appears to be a definite break in it, in the Karnatak region. Further south, beyond the administrative boundary of the region under study, the altitude is regained in the Baba Budan Hills. The immediate right flank of the Sahyadries stands in contrast to its left. The land loses only a little altitude, and in the shade of the plateau tops that mark the watershed, there occur a series of low hills with irregular trends and enclosing small valley courses which drain the land to the east. Beyond this right flank, lies the plateau portion of Maharashtra and Karnatak, which consists of major river basins separated from each other by the residual hills of the Balaghat and Mahadeo ranges. An interesting feature in topography is that both these emanate from the main chain of the Sahyadries in the neighbourhood of its higher peaks. Their residual character is seen from the uniform crestline and bands of lava flow that mark their flanks and the points of weakness in the lava outflow where erosion has created 'gaps' or passes that have played an important role in the human geography of the region.

(ii) *River Basins of the Trap region of the Plateau.*—The upper drainage basins of the Godavary, Bhima and Krishna offer a contrast to the residual hills bordering them. The *Godavary Basin* has a limited stretch in this region, but is marked by a number of tributary basins at the source. The main basin widens out further east and develops a black-soil zone in the Ahmadnagar district. Its physiographical features persist in the Nizam Dominions. The *Bhima Basin* is, in fact, a tributary basin of the Krishna, but its length and drainage area in the region mark it out as a distinct relief region. The Basin, along with that of its leading tributary *Nira*, occupies the central portion of the Maharashtra Plateau. The *Krishna Basin* has a southern trend from its source, and the tributary *Koyana* runs almost a parallel but deeply entrenched course to its west. Almost at the end of the Trap region, the Krishna swerves to the east and drains the land, skirting the edge of the lavas region. A common feature in local topography of these river basins is the lateral erosion of the rivers

on an almost horizontal stratum, thus developing meanders and banks of deposition in their course. Another is the undulating topography along the flanks, created by tributary streams. The mature black soil of the

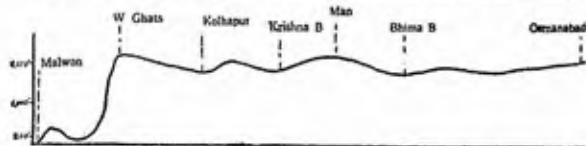


Fig. 8.—Section S. W. — N. E. 210 miles; Konkan coast and the Deccan Plateau.

Basins proper, offers a scenic contrast to that of the brownish grey, immature soils of the undulating higher zones.¹⁴

(iii) *The Karnatak Plateau.*—This part of the Plateau must be distinguished from its northern zone on account of the underlying crystalline rocks and the hills of denudation arising out of the Dharwar, the Kaladgi, and the Bhima Series.¹⁵ The region is drained by the Malaprabha and Ghataprabha system of rivers, but a part of the drainage in the south belongs to the Tungabhadra. The Western belt of the Karnatak Plateau is underlain by the rocks of the Dharwar series, where haematite schists, limestone and other porcus series have, by their greater resistance to erosion, created a region of low and irregularly shaped hills. Here the poor soils support a grassland and scrub vegetation. The central region of the plateau is traversed by the residual sandstone hills of the Kaladgi series. With their uniform crestline, steep escarpment to the West and many river gorges, these hills stand out prominently in the black cotton soil plain. The rest of the region that is underlain by softer crystalline rocks bears a deep cover of the fertile black soil. Its uniform distribution all over the portion distinguishes this zone from the black soil belts of the Trap region.¹⁶

(iv) *The Tapi Basin.*—The Tapi Basin in Khandesh is a separate relief region on account of its westward orientation and alluvial deposits. On the outskirts, the general topography is that of the Trap region, but there is a greater extension of the black soil in East Khandesh. The deeply entrenched bed of the river and the dissected appearance of its banks is another characteristic feature of the landscape. The *Girna Basin* is a sub-region of the major basin.

(v) *The Satpuras and the N. E. Highlands.*—This highland belt separates Western India from Malwa. The topography of the Satpuras.

14. Scharabaddhe: Soils of the Bombay Presidency.

15. Foote: p. 79; Pichamuthu, J. M. U., p. 94; escarpments and dip slopes are equally true of the Dharwar Schist Belts and Kaladgi outcrops.

16. Foote: p. 251.

like that of the Sahyadries, is mainly determined by faults. But the landscape presents a drier appearance under the influence of the climate, and the rocks of the Vindhyan system. On the other hand, the N. E. Highlands are underlain in the south by gneissic material and in the north

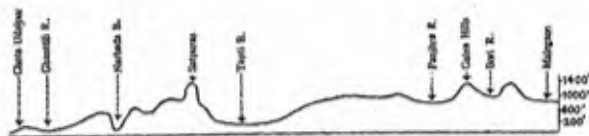


FIG. 9. — Section N.—S. 250 miles across the Narbada and Tapi Basins.

by the lavas. Accordingly, the southern hilly zone presents a picture of landforms not unlike that available in the western part of the Karnatak Plateau. The Narbada rift separates the Satpuras from this highland belt.

(vi) *The Konkan Coastlands.*—In area, the lowlands of Western India compare unfavourably with its plateau forms, but these are the intensely concentrated regions of human habitation. The Konkan coastlands, according to some geologists, are a platform of marine denudation raised to form a narrow plain. This region is abutted by the backbone of the Sahyadries terraces and bear a much dissected appearance on account of rifts, and erosion by ungraded streams. The plain is further interrupted by parallel and transverse hills which are probably features of faulting. Several sub-Sahyadrian hills reach the sea, thus denying the plain a uniformly level and continuous character. The plain is drained by parallel streams, which bring a vast eroded material from their upper reaches and deposit it in the lowland zone that abuts the shore-line. Deposition is therefore prominent in their lower reaches, but it is much more so in the estuarine regions. An interesting feature is the development of acute bends in the course of many rivers. These coastal lowlands extend from the southern end of the North Kanara to the Damanganga River in the north. In Kanara, their level character is much restricted by the intervening hills. Further north, the receding Sahyadries create a 'bay' into the lowland territory of Goa where drainage and coastline force human activity on the Marmagaoa Creek. In South Konkan again, the plain is broken into parts by hills and the extensive occurrence of laterite renders most of the land unserviceable to man.¹⁷ The Kalyan Basin separates the South from the North Konkan where there is an appreciable widening out of the plain with a line of low hills running lengthwise in the centre.

17. Wilkieson, quoted by Foote, 226.

Beyond the Damanganga river, the Sahyadries curve inward to develop the alluvial lowlands of the Tapi mouth.

(vii) *The Gujarat Alluvial Plain.*—To the north of the Konkan plain lies a lowland stretch of recent origin a creation of fluvial and marine deposition. This is the Gujarat alluvial plain developed and drained by four major river systems and bordered on the north and north-east by the belt of C. I. Highlands. Its basal complex is formed by harder crystalline deposits, but alluvium determines the topography and land utilization. The level nature of the plain is interrupted in places by detached hills of volcanic origin like the *Pavagadh*. Over a large area, the plateau is deeply intersected by streams. In certain reaches, its major rivers, like the Mahi, have cut a deeply entrenched bed. This erosive action is prominent in the north-eastern and central parts of the Gujarat plain, and the coastal regions around the Gulf of Cambay, therefore, offer a contrast because of the deposition of detrital matter by the river systems. Extension of *gravel patches* along the river courses has its origin in the process of denudation.¹⁸ Near the coastline, these are succeeded by sandy belts along the mouths of the major rivers. Thus salt marshes, sandy belts and gravel patches mark the topography of the coastal region, while the even nature and fertility of the plains in the interior is much influenced by water erosion.

(viii) *The Kathiawar Highlands.*—The Highland core of Kathiawar is underlain by granite masses. Volcanic effusions and spread of lava followed by a long process of denudation have created a basaltic topography in many parts. Thus the Gir and other ranges are residual stumps having a granitic complex. Beyond the central highland core, softer elements of the lava deposits have eroded to form river basins of which the Bhadar is the most prominent. The same process has exposed the Umia and Wadhwan Sandstone beds in the north-east.¹⁹ In these lowland regions, underlain by lava and alluvium, erosion has uncovered basaltic dykes which, in the shape of low running hills, create a sharp change in local relief and influence the underground supply of water, much to the advantage of the rural community.²⁰

(ix) *The Kathiawar Coastal Regions.*—The coastal belt of the Peninsula is underlain by a variety of rocks the resistant characteristics of which determine the relief of the plain. The Halar coastal fringe and the Bhal have been developed on alluvial deposits. A sluggish pattern of drainage and marshy areas near the coast line are the characteristic features in their relief. The Sorath Coast has an outcrop of *Gaj* and *Dwarka* beds. Land abutting the coast line is alluvial but accentuated in

18. Allen : Soil Erosion in Western India, 1940.

19. Pedden : p. 7.

20. Pedden : p. 28.

relief by laterite outcrops and by the aeolian deposits of the *miliolite* which is famous as the Porbandar stone. The Marshland areas, locally famous as 'Gher', the low hills of *miliolite*, and the *limestone topography* developed over the Dwarka beds, are the characteristic features of landscape in the southern Kathiawar Coast.²¹

(x) *The Cutch*—Cutch has several distinguishing features in relief. The all enclosing *Rann* gives it an almost isolated character which has reflected in the human geography of the region. The Rann was, not long ago, a shallow arm of the sea, but a rising movement and deposition of silt give it, during the dry season, an *appearance of land*. The hilly interior of Cutch is due to volcanic effusions, but, southwards, denudation has exposed the later rocks. The topography in the south, however, has been largely determined by river erosion working in an arid climate. Deeply entrenched major streams and a much dissected level surface, therefore, are the typical features of natural scenery.

THE ARABIAN SEA. The Arabian Sea, as has been seen earlier, has fundamentally influenced the history of Western India, and with every progress in navigation and the art of developing the wealth of the seas, it may be expected to exercise still greater influence in human geography. Certain features of bathymetry are interesting. The floor of the Arabian Sea, for the major part, consists of a deep seas plain.²² But it can be distinguished into two broad basins separated by submarine ridges. The double Murray-Carlsberg Ridge forms the main line of partition. From the southern oceanic expanse, these basins are fairly well marked off by the Mauritius, Chagos, and Laccadive branches. Probably because of the fractured nature of the coastline, the continental shelf is narrow, particularly along the African and the Makran coasts. It is joined to the deep sea plain by a steep continental slope. Along the West coast of India however it has a greater extension. It begins from the Indus 'Swath of no ground' and continues as a fairly wide platform up to South Kanara. But further south along the coast of Malabar and Travancore, it is much restricted.²³ Both the 100 and 40 fathom lines run parallel to each other and have a south-easterly trend. The 40 fathom line has an interest in that, it demarcates the more useful area from the point of view of human geography. The Gulfs of Cutch and Cambay are shallow. The Rann is an extension of these shallow seas, and a rising coast line in these parts favours extensive deposition of aluvium. In addition to its shallow nature, the Gulf of Cutch is noted for its coral formations a feature that

²¹ Kathiawar Gaz; Fedden: p. 54.

²² Seymour Sewell: 'Oceans round India' in outlines of Field Sciences in India, p. 22.

²³ Fig. 10.

constitutes danger to shipping.²⁴ Towards southern Kathiawar there is comparatively a greater depth. The Gulf of Cambay, on the other hand, differs in many respects from its neighbouring regions. Of the shallow features of

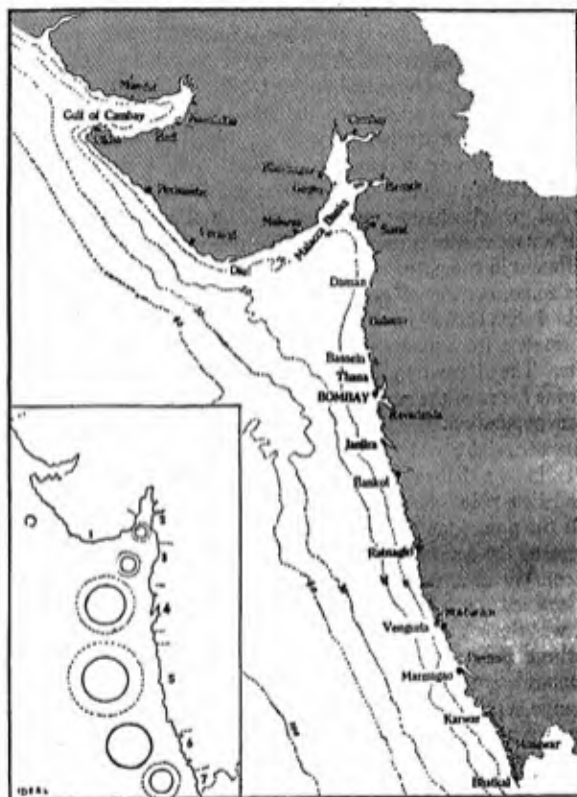


FIG. 10 — The Arabian Sea and the ports of Western India.

Bathymetric lines are in fathoms. *Inset*: Fishing Grounds; the outer circle represents the annual catch produced in each zone, and, the inner, the number of persons engaged in the industry. For details, see Table II.

the Gulf, the Malacca Banks off the mouths of the Tapti and Narbada, are important. Practically the whole of the Gulf is above the 10 fathom line, and is marked by islands of deposition in all the major estuaries and

24. Kathiawar Gaz.; also "W. Carrick" p. 13.

also along the Kathiawar coast of the Gulf. Deposition from the Gujarat rivers, is rapid and extensive, and the large amount of fresh water received, lowers the salinity of the Gulf waters. In its orientation too, the Cambay Gulf differs from the Gulf of Cutch. Because of its more pronounced southerly aspect, it is more open to the influence of the south-west monsoons. Its narrowing neck tends to intensify the effects of tides and leads to the occasional formation of 'bores'. The triangular areas between Diu, Daman and Bombay is a continuation of the Gulf, and forms the largest stretch of the continental shelf of this region. South of Bombay, the sea floor resumes a deeper course, as is indicated by the parallel bathymetric lines running close to the coast line. The coast line here is marked by alternating headland and bays, and the absence of large rivers is a noteworthy feature. The floor deposits consist mostly of mud, but different in composition to the mainland formation of lava.²⁵ In the shallow zones, occasional stretches of coarse sand and detritus have been located. It has been argued that the mud deposits undergo considerable transformation from season to season under the influence of the ocean currents. The alternating north-east and south-west monsoons influence the marine fauna of the region and consequently the occupations of the maritime population.

✓ Apart from the wider influence of the Arabian Sea as a maker of contacts in the Indian Civilisation, it holds a twofold interest from the immediate point of view of economic activities of the Western India littoral: the promotion of oceanic and coasting trade through its ports and secondly the development of its fisheries. ✓ Historically, almost every creek capable of providing safe anchorage to sailing ships had a port. What enabled some of these like Chaul and Sopara, to reach a higher status, was their favourable position in relation to the hinterland. From the earliest times the estuarine ports like Broach, Surat, Chaul, Mirjan, and Honawar, were famous in the early Hindu Period as oceanic ports. But change in physical conditions and progress in navigation have from time to time affected the fortunes of these ports. The silting up of the estuaries and the development of sand bars across their mouths have rendered many ports unsuitable. ✓ The evolution of large sailing ships conspired to make their position worse. "This twofold influence of Nature and Man may be traced throughout the historical period, in the steady westward march of these ports towards the open seas, in search of deeper anchorage facilities. Mirjan in North Kanara gave way to Kumta and, Gersoppa to Honawar."²⁶ In the north the prosperity of Kalyan was gradually usurped by Bassein.²⁷ In more recent times, the transfer of the

25. Seymour Sewell : p. 23.

26. Karwar Gaz : p. 48

27. Thana Gaz : p. 418.

docking arrangements by the East India Company from Surat to Suwalli Roads illustrates the same process that has now culminated in the 'natural selection' of Bombay as an oceanic port in the days of steam ship. This does not however mean that the other ports of West Coast must cease to exist as ports. Marmagao because of its improved harbour facilities as well as natural advantage, is a leading port. The recent revival of Kathiawar ports shows how the other ports of Western India could be brought in efficient state in the modern economic system. If in the national post-war reconstruction plan, a programme for improving the break waters, the anchorage and harbour facilities, communications with the interior, and the creation of an administrative body like 'Western India' Port Authority to provide a continuous and efficient maintenance, is undertaken, almost everyone of these ports is capable of taking its place in the coasting trade of the region, without affecting in any manner the prosperity of Bombay, and some of them like Karwar would serve as good 'alternative sites' to Bombay, a national necessity so forcefully brought home to us in the present days of air warfare.

FISHERIES. How far does the wealth of the seas influence the economic and political development of nations can be gleaned through the expansion of maritime powers like Spain, Great Britain, and in recent years, Japan. The Marine fisheries all over the globe have produced an abundant food supply that has hardly shown signs of exhaustion.²⁸ But, what is more important in the history of Civilisation, is that they have also produced the sea faring nations of North-west Europe, the pioneers in the age of discovery and invention. The fisheries of Western India have potentialities in both these directions. The Maratha history well illustrates the political aspect of the command over the Arabian Sea, for, the Marathas were the only Indian power in modern history to develop and retain naval strength during the 18th Century. The Maratha Empire had its strength in the Konkan fishing community, and this influence of the sea in producing a class of adventurous and seafaring population continues unabated even to this day. Again, from the economic point of view, the fisheries, owing to their prolific nature, have sustained a large element of population in the maritime nations like Great Britain, United States, Canada, France, Norway and Japan²⁹. In Japan, the art of exploiting the sea food has, under the stress of economic conditions, reached a high state of efficiency. It is needless to say how valuable would the fisheries be from the point of

28. Only recently depletion of certain fishing grounds in the Atlantic is being viewed with concern; See En. Brit. 14th Edn, article on 'Fisheries'.

29. Annual value of catch in £s.: Japan 30,600,300; Gt. Britain 20,250,000; U. S. A. 19,000,000; France 7,000,000; Norway 4,850,000.

economic development. The fisheries, as has been emphasised by the Royal Commission on Agriculture, should stand as a substantial auxiliary to an already overburdened agrarian economy³⁰. This aspect must be all the more stressed in view of the post-war reconstruction plans that are being proposed now. The fisheries of Western India are potentially rich, but are hardly developed. In comparison to the Coromondale coast and the Ganges Delta, the West Coast is better situated in respect of the extent of the fishing grounds and the variety of the fish supply. The fishing grounds of Western India with an area of 55,000 sq. miles are larger than those of Madras and Bengal. The average annual marine catch and the average number of persons engaged in the marine fisheries compare well with those in other maritime provinces.³¹

FISHING GROUNDS. Our knowledge of the continental shelf that abuts the West Coast still remains scanty. Very much the same may be said of the different aspects of marine biology. Broadly, however, the fishing grounds are commensurate with the 100 fathom line, beyond which the continental shelf falls steeply into the deep sea plain. This area may be distinguished into *seven fishing zones* according to the nature of the catch and the fishing methods employed³². The coast line extends for about 800 miles from Port Lakhpat to Bhatkal the southern end of the Bombay Province. The Gulf of Cutch is shallow and mostly within 20 fathoms. The floor is sandy over a major portion, but is largely interrupted by mud deposits. At the mouth of the Gulf, the sea floor is deep and it continues to be so all along the southern Kathiawar Coast. Deep sea fishing is possible in these waters. The shell fisheries are important in the Gulf of Cutch, but strange as it would seem only a small element of population takes advantage of the shell fish industry. The total fishing population of the Cutch and Kathiawar states, does not exceed 3000. Locally, Mundra, Jakhau, Anjar, Okha and Porbandar are the important fishing centres of this region, from which the catch is distributed in the interior. Quite a large percentage of it is taken off directly by the Konkan fishing boats that seasonally operate in these fishing grounds. Pearl fisheries is a minor occupation, as the haul is indifferent in quality as well as quantity. A line drawn from the Diu Head to Dahanu marks a large fishing ground that

30. "We have been struck with the comparative failure to develop the fisheries of the country as a source of food.....In Bombay, the United Provinces and Bihar and Orissa, large classes of population take it when they can get it, and in the Punjab, there has been, since the war, a largely increased demand for it. Fish forms a specially valuable addition to a diet the staple of which is rice" p. 495.

31. Table No. 1; Also Census of India, 1931, Vol. II., pt. II, p. 263.

32. Report of the steam trawler "William Carrick", p. 12; Dr. Sorley: "Marine Fisheries of the Bombay presidency", p. 15.

covers 14,000 sq. miles, and encloses the shallow waters of the Cambay Gulf. The fishing possibilities of the Gulf region yet await investigation, but it would appear that favourable conditions exist for the exploitation of demersal fishes. The estuaries of the Narbada, Tapti and Ambika rivers, and a strip about three miles wide abutting the shore line, and numerous creeks, constitute the main fishing areas. Estuarine and fresh water fishing increases in importance towards the mouth of the Narbada and Tapti. But fishing as an occupation plays a minor role in the economic life of this region owing to a variety of causes. The agricultural wealth of Gujarat and Kathiawar, and the religious restraint among the Hindus are probably the main deterrent influences. In the densely populated littoral districts of Kaira, Broach and Surat, the fishing population does not exceed 15,000, and a substantial part of it depends on fresh water fisheries. The leading ports of the Gulf act as fishing centres. In particular, Dumas, Bulsar and Dahanu in south are well known for their catch. The metropolitan region of Bombay holds a unique position in regard to fisheries. It constitutes a powerful factor in this industry because of the steady and large demand of the population for fish. This explains the thriving fishing community in and around the city. Fresh fish is caught and landed within a radius of ten miles from the city, through the indigenous fishing and transport methods. A string of public and private markets distributes the catch to the population at a remunerative prices. The introduction of power transport by the Fisheries Department has extended the area of the fresh fish supply, yet the Bombay market, particularly during monsoons feels an acute shortage of supply, owing to the limitations of the indigenous industry. The influence of Bombay extends more to the south than to the north. In Konkan, Goa and North Kanara fisheries possess a greater economic importance. The poverty of the lateritic soils, and the Sahyadry barrier which cuts off the coastal lands from the rich plateau, have forced the population to look more towards the sea as a source of living. South of Bombay, the sea floor shelves rapidly, and thus there is continuous narrowing of the shelf towards South Kanara. The absence of large rivers makes fresh water fisheries unimportant. But Konkan grounds are well known for their deep sea fishing. A population exceeding 32,000 depends on marine fisheries. A major catch of the leading commercial fishes is hauled off the Konkan grounds. Most of it finds its way fresh or cured to the Bombay Markets. Absence of large local markets and inadequate system of communications, make fish curing an important and necessary aspect of the Konkan fisheries. This explains the existence, unlike in other littoral areas of the region, of a large number of fish curing yards. The rocky headlands and the sea bottom deposits of the Konkan coast have promoted shell fisheries in the neighbourhood of Bombay, and many Konkan creeks in the south. Thus the deep sea, inshore, estuarine and

shell fisheries have influenced the human activities in this region to a much greater degree than in Gujarat and Kathiawar. Most of the Konkan ports, but Bassein, Revadanda, Malwan and Vengurla in particular, draw their economic support from the fisheries, and act as centres of distribution inland as well as for Bombay.

The influence of religious and political aspects of human activity is well reflected in the flourishing fisheries of Goa. The shallow and much silted Aguada offers good physical conditions to the development of estuarine fishing. The sluggish drainage of the Salsette and the Ilhas Districts promotes a considerable degree of estuarine and inshore fishing. Fishing in the deeper waters off the Marmagao headland and Cape Ramas yields good catch in the leading commercial types of fish. Similarly shell fisheries play an important part in the general framework of the industry. These natural advantages have all the more been strengthened by the political, economic and religious status of the population. The status of Goa as a Portuguese dependency has prevented a free economic interplay between itself and the surrounding British Districts, and has forced the human attention to develop the limited home resources. Agricultural position is hardly satisfactory and the dense population makes the burden on home resources worse. Fish therefore forms the leading article of food with a population that is economically hard pressed and socially free from religious prejudices. The economic importance of this industry in Goa, is thus seen from its large home market and from the fact that it supports more than 10,000 full time workers.³³

COMMERCIAL FISHES: THEIR DISTRIBUTION. Many species of the West Coast do not appear in shoals, and the fisheries do not produce so homogeneous a catch as those in temperate waters.³⁴ This in itself must be considered as some handicap to their economic development. But leading commercial types in these waters exhibit preference to localities, and certain generalisations therefore are possible as regards their regional distribution and seasonal characteristics. Of the deep sea fishes. Ghol (*Sciaena diacanthus*.) Wagli (*Trygon walga*), Wam (*Muraenesox talabonoides*), Pomphret (*Stromateus cinereus*), Shingala (*Arius*), are commercially important.³⁵ Ghol has a wide distribution and commands a good market particularly in Bombay City on account of its white flesh and good size. "Its commercial position here may perhaps be compared with that of Cod in the fish markets of Europe or North America."³⁶ In

33. Censo da população: Vol I, p. 9.

34. Sorley; p. 120.

35. "W. Carrick": p. 19.

36. Spence and Prater: J. B. N. H. S. 'The Fish supply of the West Coast of India' Vol. XXXV, p. 77.

addition to its value as food, large ghol is useful in industry for its swim bladder from which is obtained isinglass. Under the local name Wagli come all kinds of skates and rays which are to be found in all the fishing grounds. In abundance of catch this group of fish stands next to Ghol and commands a wide market among the poorer classes. Wam seems to show a preference to North Konkan and South Kathiawar grounds. Pomphret is the most known and popular fish in the Bombay market, obtained from the Konkan grounds. Shingala appears to be well distributed in the muddy waters near Bombay and provides an abundant catch. Ravas (' Indian Salmon ') is fished in large quantities in Konkan grounds. Karel (*Pristipoma*) Tambusa (*Lutianus*) Dori (*Scienarides*) and Chand (*Drapane*) are some of the other types which held an important position from the commercial point of view. But apart from these whose value and prospects in power fishing have been emphasised by Hefford, Surmai (*Cybius*), Palu (*Chrysophrys berda*) and Bombay Duck (*Harpodon nehereus*) are important in the indigenous industry. Bombay Duck like Pomphret is mainly fished in the North Konkan and South Kathiawar grounds. Various species of Mackerel (*Caranx*) like Bangda are to be found notably in the South Konkan, Goa and North Kanara grounds. Estuarine fishing has a twofold significance in the local economy, in that it produces species like Grey Rock Perch, Grey Mulletts, Lady Fish and Gobies, which command a good market, and secondly, it also provides a substantial auxiliary support to the fishing community during the monsoons, when the open sea fishing suffers from climatic handicaps, and when migratory fishes forms like the Cock, Niwatas, and larger fishes like Ravas and Shendwa crowd up the estuaries in search of food and for spawning.

SEASONAL MIGRATION AND OTHER ASPECTS. Much scientific investigation needs to be done in order to obtain reliable and detailed data regarding the areas of abundant supply, the migratory habits, the spawning season and localities, the influence of bottom deposits, of temperature and a salinity of waters, and of the monsoonal currents. In deep sea fishing, the 20 fathoms line is reported to give the best yield. In the Gulf of Cambay, Mudar and Palwa are found in large quantities during the monsoonal months but most of the important types show an abundance in the cold season when the fish move from south to north in search of food. Bombay Duck, for instance becomes abundant at the end of the south-west monsoons.³⁷ Its wanderings, according to Hora, are influenced by the supply of food species and possibly also due to marked changes in the physical conditions of shore waters, low salinity probably promoting its growth.³⁸ Again Ghol, Wam, Sarang, Bombay Duck, come in shoals

37. Sethna : " Fishing for Bombay Duck " J. B. N. H. S. Vol. XXXV, p. 869.

38. Hora : " Wanderings of Bombay Duck " J. B. N. H. S. Vol. XXVI, p. 649.

landwards to escape the predacious fish that pursue them. A generalisation regarding the spawning season is hardly possible for want of sufficient data, but it has been observed that most of the Konkan fishes are in roe at the approach of the south-west monsoon. Bombay Duck, for example are full of roe in April and May; Mackerel and Sardines from June to September.³⁹ Not much is known about the influence of the bottom deposits, plankton, of the temperature and salinity, and currents of the marginal waters. A muddy bottom is reported to be generally prolific in supply. Monsoonal currents show a tendency to drive the fish in shore; and there seems to be much local migration near the shore and estuaries due to changes in salinity, and nature and depth of the grounds suitable for spawning.

W **SHELL FISHERIES.** Quite in different category but holding a substantial economic importance and scope, stand a group of marine products that are popularly called "Shell fisheries," in which are included oysters, clams and cockles, sea mussels cuttle-fishes, and also crustaceans like prawns, crabs, and lobsters.⁴⁰ Clams have a wide distribution from Bombay to the south all along the coast. They occur in large beds in the creeks having clean sandy bottoms and shallow waters, and form a leading marine product in south. Clams provide a cheap but nutritious food to the poorer classes and thus command a large market in Konkan, Goa and North Kanara. Oyster is probably the most highly prized shell fish on account of its taste and food value. Of the three more important edible species, *Ostrea gryphoides* is found in muddy creeks where it is restricted to the low tide area, and the Rock Oyster (*O. cucullata*) along the rocky coast in the high tide zone. The Cutch creeks, Okha, Dwarka, Porbandar and southern creeks of Mahim, Alibag, Ratnagiri, Jaitapur, Malwan, Vengurla and Karwar, possess large oyster beds. The Clams and Oysters are worth over Rs. 1,50,000 annually. In addition to these main shell fish types, minor types like the sea mussels, window pane oysters, cockles, are obtained in good quantities in Konkan creeks and Cutch. Prawns similarly have a great economic value. They are well distributed all along the Bombay Coast and its annual yield is estimated at Rs. 2,50,000. Edible crabs and lobsters are common to this coast and are estimated to yield Rs. 25,000 annually.

ECONOMICS. The present position of fisheries can be gauged by the fact that the marine fisheries alone employ about 51,000 full time workers in the Bombay Province, and the estimated average catch is 55,000 tons

39. Sorley : p. 119.

40. Rai : 'Shell fisheries of Bombay Presidency' J. B. N. H. S., Vol. XXXVI, p. 826.

per year.⁴¹ The Baroda Fisheries afford a livelihood to a population of 2000 persons.⁴² Figures relating to the maritime states and Goa are not completely available, but it would not be unsafe to conclude that the fisheries of Western India support a population of about 150,000 full time workers and dependants. The amount of capital invested in the Bombay industry is about Rs. 29 lakhs; this figure will substantially increase if valuation of the industry in other parts is carried out. How important are the fisheries in our economic life may be realized by comparing the figures of persons engaged full time in different maritime provinces and states.⁴³ Bengal easily leads, but there the fresh water fisheries have a greater importance. In Madras, the west coast fisheries provide that province with its major source of sea wealth. Western India ranks third, but figures relating to the Travancore state are interesting in that they show a fairly well developed indigenous fishing industry of the West Coast, and serve as a guide to a similar development in other part of the country.

In annual production, the Bombay fisheries are estimated to yield an average catch worth Rs. 80 lakhs. The shell fisheries are calculated to produce an income of Rs. 30 lakhs on an average. Subsidiary industries like fish oil, fish meal, isinglass and fish mas, fish preservation, boat building, and rope making, are worth well over Rs. 5 lakhs annually, and play a significant role in the economy of the maritime districts. The industry of the Bombay coast is of indigenous type running from times immemorial on the customary lines, without being influenced by modern methods. It is in the hands of local fishermen who have shown, especially in Konkan, enterprise in their undertaking and it can be seen that the industry is in a state of efficiency from the type of fishing gear and equipment used and from the earnings of the fishermen. The average annual income of the Konkan fisherman is estimated to be Rs. 300 and that of the Kanara fisherman Rs. 168 which in view of the lower cost of living in Kanara is not out of tune with local economic conditions.⁴⁴ The earnings of the Gujarat and Kathiawar fishermen are almost the same as those of the Kanara fisherman. The good physique of the fishing community is

41. Borley : pp. 40 and 41.

42. Baroda State Abstract 1931-39 ; p. 25.

43. Census of India. Vol. XIV. pt II. p. 735. The following figures relating to the west coast districts of the Madras Presidency are illuminating :

	Earners		Working Dependents		Subsidiary	
	Male	Female	Male	Female	Male	Female
MALABAR—	19460	300	189	47	814	107
S. KANARA—	9392	733	155	75	107	76

There is no reason to think that any fundamental difference exists in the natural supplies of fish between these districts and the Gujarat Coast where people engaged in the marine industry hardly exceed 4,000 l

44. Sorely : p. 41; Census of India 1931; Bombay part II, p. 266.

attributed to their fish diet, and in spite of their general backwardness in education, the community has shown enterprise and initiative. These aspects of the fishing population afford an illuminating contrast to the economic position of the agriculturist in the interior who suffers from all the handicaps and trammels of a low earning capacity, burden of indebtedness, poor physique, malnutrition, and a fatalistic outlook.

Yet it must not be supposed that the industry is without any handicaps or problems to face, or that it does not hold any scope for future development. The limited efficiency of the fishing gear and boats prevent the fisherman from exploiting the deep sea supplies. The same handicap forces him to curtail his activities during the south-west monsoons. There is a considerable degree of indiscriminate fishing particularly in case of oysters and clams. Even on open seas, large quantities of immature fishing seriously depletes the wealth of the seas.⁴⁵ Similarly, on many occasions large quantities of smaller type are destroyed on sea because the boats plying in search of larger types do not reach the shore before the smaller type begin to decompose. The pace of fishing is slow under the sail, and so is that of transport of the catch from grounds to the shore. Pollution of shore waters by sewage in some highly productive creeks has prevented the growth of oysters and clams.⁴⁶ But the greatest handicap that the industry suffers from lies in the difficulties of transport and marketing.⁴⁷ Perhaps in no other civilised country is Marshall's illustration, in the theory of value, of fish as a perishable commodity, is borne out so well as in India. Transport from the seas is slow because of the use of sailing boats. Absence of modern preservation processes like canning and refrigeration makes the sale of the catch a quick necessity. Lack of the systematic transport from shore to markets worsens the situation, and the absence of organised methods of marketing very often leaves the fisherman to the tender mercies of the middleman.⁴⁸ Fish curing and salting has been a partial solution and it is operative only in the southern areas, possibly because no adequate market for cured fish exists in the north.

SCOPE AND IMPORTANCE. Under the influence of modern methods of large scale production, attempts are being made to introduce power fishing. The work of 'William Carrick' in 1923 was declared to be unfavourable as a commercial undertaking. On this, authorities have expressed the opinion that the working of 'William Carrick' should be judged as a pioneer enterprise irrespective of its earnings, and in any

45. Sethna : J. B. N. H. S., Vol. XXXVI, p. 869.

46. Rai : J. B. N. H. S., Vol. XXXVI, p. 832.

47. Spence and Prater : J. B. N. H. S., Vol. XXXV, p. 85.

48. Sethna : " Marine Fisheries of Bombay Province " J. B. N. H. S. XLI. p. 35.

case, the operation of a large trawler fed on coal could not be held to prove that no case exists in favour of power fishing.⁴⁹ Dr. Sorley in his enquiry in 1933 reported in favour of the introduction of motor launches. The subsequent introduction of such launches by the Bombay Fisheries Department have produced encouraging results in the system of transport of fish from the far off southern grounds to the Bombay market. Power fishing, with reference to both demersal and pelagic types shows great scope, but must be preceded by a thorough investigation of the relevant aspects of marine biology. If the Government give a lead both by way of demonstration and suitable undertakings, it can hardly be doubted that the fisheries of Western India would soon be a leading source of economic well being.

If demand is to be taken as an index to economic enterprise, then it must be said that there is a great scope for fisheries development, even under the existing circumstances and handicaps. The high prices that many commercial fishes yield in Bombay and other coastal towns is an indication that the supplies do not completely satisfy the urban demand. "The present supplies are not only below the potential, but even below the actual demand. Adjustment of supplies to demand is our main problem."⁵⁰ Imports from Sind and other parts of India prove that the local supplies are inadequate to meet the demand. Further, there is an acute shortage of fish during the monsoonal season. The potential fish eating population of the Province is estimated to be 80% of its total. When caste and religious prejudices against fish eating die out, as they must in course of time, and if sea fish is made available to inland population which, at present, has hardly a chance to see it, it is hardly to be doubted that the actual demand for fish would record a steady and substantial rise. As regards the potentialities of the fish supply, it is enough to point out that, the West Coast fisheries are far more rich than those of the Coromondale Coast as is seen by the development in Travancore and the West Coast districts of the Madras Presidency.⁵¹

The future development of the industry must lie in a judicious combination between private enterprise and State aid. Reform in the indigenous

49. Even the Royal Commission on Agriculture remark: "Generally, we note that it has been the policy of local Governments to insist upon the Fishery Department paving its own way and that, in consequence, the staff has been restricted to a few numbers. We regard this as a mistake and recommend that a longer view should be taken of the possibilities of development of the fish resources of the country in the interests of the people as a whole. The chief objects of the department should not be revenue, but public benefit." p. 496. See also Spence and Prater. J. B. N. H. S., Vol. XXXV.

50. Sethna: J. B. N. H. S., Vol. XLI, p. 356.

51. Of late the scope in 'Shell' fisheries by way of systematic farming of Oysters, Clams, Prawns, etc. has received much attention among the experts; see Chopra: Proc. Ind. Sc. Congress 1943, Presidential Address, 'Prawn Fisheries of India.'

industry is necessary not only to the extent of removing the present handicaps, but in giving it a positive aid, in order to enable it to take its proper place in the economic life of the maritime districts. The question of the State aid to industry has been controversial. It has been argued on one side, that facts do not warrant a comparison between the West Coast fisheries and the Japanese in which the State aid plays a dominant part, that the wide tastes of the Japanese consumer act a mainspring to fishing enterprise, and create a large demand for the marine products, and that no such demand exists in India. Further, that the experience of the Madras Government is not in favour of such attempts by the State because the public has not yet learnt to take advantage of the facilities afforded by the State. But, on the other hand, the experience since the depression of 1930's, accentuated by the present war, has brought about almost a revolutionary change in the economic outlook and policy. The present wartime controls on national economy and the success of economic planning both in peace and war, have already prepared this country to embark on an ambitious programme of post-war reconstruction in which the Indian Fisheries will have their role in providing a means of living to a section of population and a balanced diet to a still larger but undernourished element. The State aid to fishing industry must come in by way of (i) providing a research organisation to study the wealth of the seas, (ii) maintaining an adequate staff of experts to translate the knowledge gained by the research branch into practical methods that can be readily accepted by the fishing community, (iii) regulating the fishing grounds by legislation and administrative supervision in order to prevent the unnecessary depletion of the marine resources through ignorance, (iv) organising an adequate system of transport, preservation, storage, and marketing of the catch, (v) coordination of the main and subsidiary industries within the larger framework of the national industry, and (vi) providing an adequate system of financing which should enable the industry to maintain its efficiency and catch up with every progress in its technical field.

From the immediate practical point of view, the last three are important aspects in the fisheries of this region. A coordinated transport system both by land and sea from Konkan and Gujarat to Bombay and other urban agglomerations on the coast and also to the interior would create a larger and steady supply improvements in storage. Marketing by cooperative methods under State supervision would add greater strength to the industry, and eliminate the middleman. An initial programme of state financing would attract private enterprise in its wake and pave the way to a larger size of the industry. It is possible, in view of the present 'small scale' organisation of the industry, to argue against the introduction of improved methods and large scale organisation, on the ground that it would

diminish the earnings and employment of the fishing community.⁵² But with the new technique of economic controls with which the war has made us familiar, such a tendency could be obviated and the industry could be switched on to a better economic organisation, where large and small scale units could have their own place.

The place of fisheries in national development is realised by its growth in Japan. In 1873, the Japanese fisheries were estimated at £ 1½ million; in 1925, they were worth £ 25 million. The tropical waters surrounding India are reported to be as abundant in fish supply as the waters in the temperate zone.⁵³ If therefore Japan could find a regular employment to nearly 7,000,000 persons, there is every reason to believe that the same may be accomplished in our country with a greater benefit to national economy. In arguing for the State aid to industry it must be borne in mind, that the expenses over research and administrative supervision, do not bear a direct relation to the immediate return from the industry, but must be considered as an investment in the larger nation building programme. Nor can the industry be judged on its economic plane alone. From another point of view, it must rank with iron and steel, engineering, heavy chemicals, as a 'basic' industry in national defence. The history of United Kingdom ever since the introduction of Lent fasts in Tudor days shows how her fishing industry has promoted enterprise in ship building and economic adventures, and produced a maritime nation that has played a powerful part in modern times.⁵⁴

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4. D. N. Wadia : "Geological History of India"; *Outlines of Field Sciences in India*, 1937.
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52. Bombay Economic and Industrial Survey Committee report : Vol I, p. 146

53. Seymour Sewell quoted by Sorley ; p. 119; Sethna : J. B. N. H. S. Vol. XLI, p. 259-

54. Great Britain is already expressing her concern over the position of the fishing industry after the present war. The 'Economist' (12th August 1944) thus points out the national importance of the industry : "The problem has always been the same fundamentally strategic one of preserving intact in times of peace a body of men whose seaman-ship and experience can be of value to the Royal Navy and the Mercantile Marine in times of war," and concludes that, "and plan for the rehabilitation of the fishing industry must have its foundations in a complete understanding of its place in the national economy and in national strategy."

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TABLE I
POPULATION ENGAGED IN FISHING : A COMPARATIVE STATEMENT

	India	Bombay	W. I. States	Madras	Bengal	Travancore
Earners						
{ Male	601,126	42,108	1,193	117,467	158,624	31,544
{ Female	120,864	9,100	269	34,812	3,388	2,540
Working						
{ Male	37,815	3,910	296	5,657	2,078	3,659
{ Female	30,945	5,071	296	7,359	4,205	376
Dependants						
{ Male	161,288	4,775	100	12,513	23,855	1,053
{ Female	15,842	2,800	...	928	2,379	77
Subsidiary						
Occupation						

TABLE II
AREA, ANNUAL CATCH AND THE NUMBER OF PERSONS ENGAGED IN DIFFERENT FISHING ZONES

	1 Cutch Kathiawar	2 Gulf of Cambay	3 North Konkan	4 Bombay Grounds	5 South Konkan	6 Goa	7 North Kanara
Area (sq. miles)	...	13,200	4,500	15,000	9,600	3,000	3,700
Catch in tons	...	—	3,960	13,975	18,265	—	7,775
Persons engaged in industry	...	2,306	3,212	9,505	11,289	11,000	5,548

* Figures relating to Cutch-Kathiawar and Goa are not available.

CHAPTER III

Climate

It is perhaps commonplace to state that the general climatic conditions in Western India are governed by the larger meteorological forces that prevail over the continent of Asia and its important sub-centre, India. "The interference with the planetary circulation exercised by land masses is every where evident, but the extent of interference is proportional to the size and compactness of the continental block. It is natural, therefore, that Asia should be the continent of monsoons *par excellence*."¹ The unequal heating of land and water produces over Asia major changes in the planetary wind system, in which India as a sub-centre fully participates. It is customary to recognize, after Eliot, the cold weather, the hot, the south-west monsoonal, and the retreating monsoonal, seasons, in the climatology of India.² These major aspects of the climate are briefly but clearly stated by Normand. "During the winter third of the year, the general flow of the surface air strata is from land to sea, and thence over the Indian seas as the *north-east monsoon*; it is a season of winds of continental origin and great dryness. The summer third of the year sees a complete reversal of this condition in a flow, from sea to land, of the moist winds of the *South-west monsoon*, which consequently is a season of much humidity and cloud and frequent rain. Between these principal seasons of the year are the *transitional* periods of the *hot weather* months, April and May, and of the *retreating south-west Monsoon*, October and November."³ These features of Indian climate hold true of its part, Western India, but certain regional characteristics are of significance in understanding the land utilization and economic development of its parts. The position of the province in relation to the Arabian sea and the peninsular land mass, and the varied relief of its interior, affect in an important degree the distribution of pressure, temperature and rainfall. These factors, in their local context, give a basis for the classification of climatic sub-types.

THE COLD WEATHER SEASON. With the rapid cooling during winter, the Asiatic land mass develops a high pressure zone, from which emanate the cold dry outswirling winds. This Asiatic 'high' has its

1. A. Miller : "Climatology," p. 110.

2. Eliot : Imperial Gazetteer of India Vol. 1, Chapter on Climate. See Miller; p. 161.

3. Normand : "Climate of India". Outlines of Field Sciences in India, p. 2.

sub-centre in the Punjab with which are associated the north-east monsoon winds that sweep the country. In the north-western regions of India the pressure exceeds 30.05 inches, but towards the edge of the Indo-

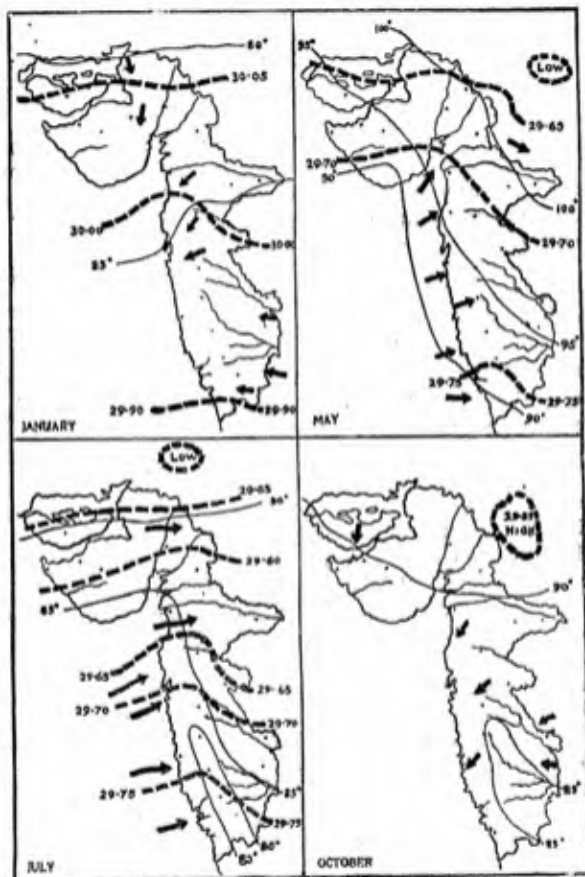


FIG. 11.—Seasonal changes in Temperature, Pressure and Winds.

The May chart illustrates conditions before the break of the South-west monsoons, and the April chart, of full establishment of this system. The background of the October thunderstorms is illustrated by the conditions of comparative calm during that month.

Gangetic plain and of the Peninsula, there is a gradual decline. While the northern part of the country is under the influence of the western disturbances, the Peninsula including a major portion of Western India, is under the influence of north and north-east winds. Here, because of the low pressure gradient, winds are light and variable. In Kathiawar and Cutch, these have a northerly component and are accompanied by conditions of calm owing to the high pressure centre in the Indus Basin. The regional distribution of temperature during this season is influenced by the cold conditions in the north, but is modified to an important degree by the Arabian sea. In general, temperature decreases from the coast towards the interior where it is also influenced by altitude. This is seen from the mean minimum temperatures of the leading recording stations. Along the coast the winter temperature is almost uniform but shows a bias towards continental influence in Kathiawar. Large diurnal range in temperature and low humidity are characteristic. Although this season is associated in the North with Western disturbances which bring cyclonic precipitation, in Western India, it is dry, with clear skies and sunny weather.

THE HOT SEASON. Beginning of March brings a transition in climate, as the sun continues his northward march. There is a rapid rise in temperature in April, particularly in Gujarat, Khandesh and Bombay Deccan as is characteristically brought out by April isotherms. During April and May the heat zone migrates to the north, to the heart of the northern plains, to establish the preliminary temperature and pressure conditions to the south-west monsoons. All over Western India there is a rise in temperature, but it is greater in the interior part of Bombay Deccan. The Gujarat plain and even the Kathiawar Peninsula show marked continental tendencies with a rise in temperature. Ahmedabad has a mean temperature of 113° in May, and the port of Veraval 105° . On the Konkan coast temperatures are lower, still the heat is unbearable because of moisture in the air.⁴

The changes in temperature are well reflected in the changes in pressure of winds during hot weather. By April, pressure and wind become unsettled under the influence of the rise in temperature. This month also marks the beginning of low pressure in the mainland. For some time there is almost a struggle between the 'high' and 'low' for extension during this initial period. With the increasing summer heat, the 'low pressure' centre definitely develops in the peninsula to the accompaniment of low pressure trough in the north. In Western India, the warmer land surface begins to draw in the sea borne winds. It is characteristic of the season that the isobars run parallel to the coast line

and there is a general movement, although feeble in the beginning, from the high pressure regions over the Arabian sea to the low pressure zone, of the peninsula. The general direction of the wind is from the west. These conditions are obtained in May and are more intensified in June as is indicated by the increasing pressure gradient during April, May and June. Thus the stage is set for that most important event in the human geography of India, the burst of the south-west monsoons.

THE SOUTH-WEST MONSOON. The prolonged heat of the summer months produces low pressure conditions in Northern India, and consequently there is an increase in the pressure gradient from the Indian Ocean to the sub-continental regions, which causes the initial, though weak, monsoonal-indraught in India. During May, the S. W. Branch is generally weak, with unsteady winds, because of the persistence of a high pressure zone in the Arabian sea, which occupies an intermediate position between the low pressure in India and the Equatorial 'Low'. With the disappearance of the Equatorial 'Low' in June, the South-west monsoonal system establishes itself in full strength bringing with it, to Western India, higher humidity and its major share of precipitation. Thus the month of June witnesses the 'burst' of the S. W. monsoons, a phenomenon which must be explained with reference to the sudden disappearance of the intervening high pressure area over the Arabian Sea, and the cyclonic character of the air movement which sweeps the entire Peninsula.⁵ The season is marked by a succession of such cyclonic storms, accompanied by 'breaks' of fine weather. This explains the pulsating nature of these rains.⁶ The season, in Western India, is marked by overcast skies, increase in humidity and a steady wind, but its outstanding fact is the arrival of the rains and their general distribution in different parts. Broadly there is a decline in the rainy season from North Kanara towards the

5. Kendrew : *Climates of the Continents*: p. 125.

6. Two aspects of the South-west monsoonal rainfall stand out : Its pulsatory nature which is attributed partly to the cyclonic nature of the much of the rain, and partly to a kind of self-feeding action, whereby the heat liberated by the heavy precipitation lends further energy to the system. Wagner ("Zur Aerologie des Indischen Monsuns" Ger. Beitr. Z. Geography.) describes S. W. Monsoon as "a stationary system of cyclonic disturbances." Cyclonic convergence is the main cause of rain. While Wagner's description of the general structure of the monsoonal pressure system and precipitation holds true, it is important to note the migration of the low pressure trough in the Indo-Gangetic Basin. "Depressions which both intensify monsoonal rainfall and tend to concentrate it in their vicinity occasionally form in the north of the Bay and move along this trough. Further the trough is not stationary but moves north and south of the normal position and affects the rainfall distribution as it moves. Consequently the monsoon period is not one of continuous rain in any part of India. Bursts of general rains alternate with breaks partially or generally as the case may be." Normand : p. 4. See also Ind. Met. Dept., Sc. Note No. 34, and Ind. Met. Mem., Vol. XXVI, Pt. II, 1933.

Gujarat Coast, but in the plateau interior. the season is strengthened by the Retreating Monsoon showers. The S. W. monsoons maintain their force till September, but their immediate effect is the general reduction in temperature. August marks a decline in temperature. By the end of September, the S. W. monsoons lose their strength and gradually make way to the North-east monsoons.

THE RETREATING MONSOON. But the transition from the S. W. to N. E. monsoons unlike the 'burst' in June, is gradual and spread over a long time. The weakening of the S. W. monsoonal current is associated with conditions of calm. There is also a slight general rise—the 'October heat'—in temperature, though humidity persists. Local heating under conditions of calm produce thunderstorms. With the increase of cold conditions in the north, the low pressure centre, not only fills up, but migrates—'retreats'—to the south towards the Peninsular interior, with the result that there is almost a 'curving' back of the Bay of Bengal monsoonal current. In the eastern districts of Maharashtra and Karnatak these winds arrive from a north-easterly direction, and are associated with some precipitation. These conditions exist almost till the middle of December and are succeeded by the temperature and pressure conditions of the 'cold season, when the 'Peninsular low' is completely driven out by the out spreading 'high' from the north. Thus, "the retreat is a long struggle between two well matched but feeble currents, the one becoming steadily stronger, the other steadily weaker, as the sun retreats towards the southern tropic."

TEMPERATURE. Some observations from the regional point of view may be usefully made regarding the distribution of temperature, winds, and rainfall. In the cold weather season, temperature diminishes from South Konkan towards Kathiawar and also from the coast towards the interior. April witnesses a general rise in temperature. May and June are, in many tracts, the months of maximum heat. During this season while the stations in the interior record higher temperatures, there is a substantial decline in heat along the coast due to the monsoons. October records a slight rise. But November marks the beginnings of the cold weather season.

It is interesting to note also the seasonal distribution of temperature in the different parts of Western India. Equable conditions prevail all along the Konkan coast, but northwards in Kathiawar and Cutch, the annual range increases. Karwar has an annual range of 5° only; Veraval records 9°. In Dwarka it increases to 11°. In Kathiawar the coastal

stations record their maximum temperature in October. Altitude modifies the average temperature in the Ghats region, but eastwards over the

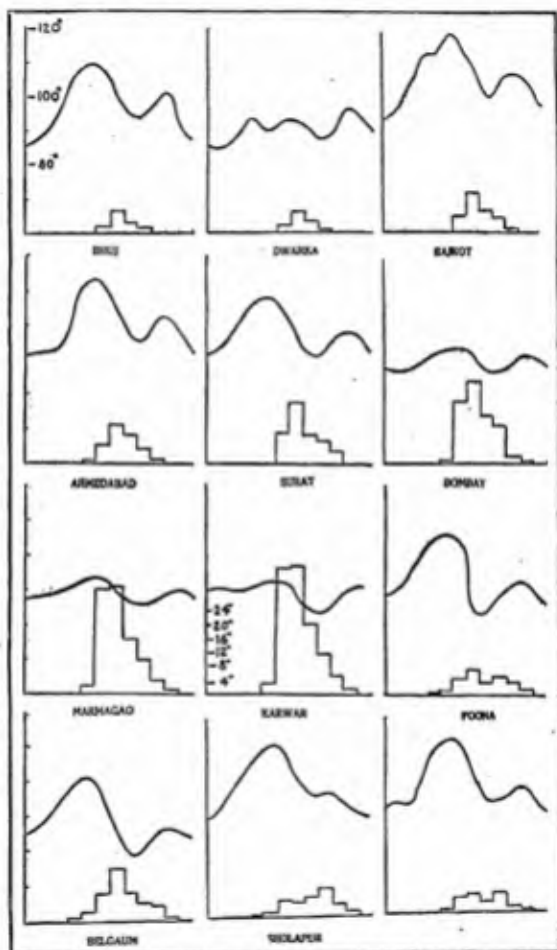


FIG. 12— Temperature and Rainfall curves of leading stations.

Plateau higher temperatures and a greater seasonal range are recorded. Sholapur, for example, records 109° in May and 89° in December. Such,

temperature conditions are almost uniform all over the Plateau tract in Maharashtra and Karnatak, except that there are local differences in winter temperatures in some parts, especially in the transitional zone abutting the Sahyadries, for which the data of Belgaum are representative. The Khandesh Basin on the other hand shows marked continental influences, and the same may be said of the interior parts of the Gujarat plain.⁸ Although a uniformly high temperature favours plant life abundantly in this region certain seasonal and diurnal changes in temperature are of significance from the economic point of view. The lower winter temperatures over the plateau have enabled wheat production in Nasik, Ahmadnagar, and Sholapur in Maharashtra, and Belgaum, Bijapur and Dharwar in Karnatak. Uniformly high temperature and humidity conditions have promoted spice gardening in Sirsi and Siddapur.⁹ The duration of cool conditions in winter has an important bearing on cotton production in Karnatak as an early rise in temperature causes the boll to open out prematurely. Winter frosts always constitute a danger to vine cultivation in the Nasik district. Some facts relating to diurnal range in temperature are also interesting. In Cutch it is about 26° and it remains the same almost throughout the year. In Gujarat plain the difference in summer is 20° but increases to 27° throughout the winter. Equable conditions are available on the coast during summer, but during the cold season the diurnal range is slightly greater indicating cool nights and early mornings. On the eastern margins of the plateau the range is as much as 35° — 40° during winter, although it shows slight reduction in summer.

WIND. The larger influences over the pressure distribution and the consequent effect on winds have been already considered. As a broad generalisation it may be observed that April is a month of transition from the cold weather pressure system to the south-west monsoonal one. Winds at this time of the year are weak and veering, and are associated during this month and the next, with thunderstorms. Pressure gradient becomes steep during the monsoons, and a strong and steady inflow of south-west winds is experienced all over the region, although the pulsatory character of the monsoon does affect wind direction in many places. Again October is a transition month marked by conditions of calm and thunderstorms. This is followed by the north-east winds of the retreating monsoons, which are finally supported by the wind system of the cold weather season. From the local point of view, the increase in diurnal range in pressure during winter, the greater influence of land and sea breezes

8. E. g. Malegaon: Mean Min. Tr. 43.6° in February; mean daily range 34° in winter and 29° in summer. Ahmedabad: Mean Min. Tr. 49.8° in Jan; daily range in temperature great in winter but not less than 20° in summer also.

9. Dept. of Agri. Bombay; Bulletin No 83, p. 3.

during this season, the rapid transition in pressure and wind during April and October, variable winds caused by depressions, and conditions of calm which favour the formation of thunderstorms before and after the south west monsoons, are factors of great importance in the climatology of Western India.¹⁰

Certain regional observations in regard to wind direction and velocity are interesting. These bring out the fact that not all parts of Western India experience the same types of winds during the monsoonal seasons, and that veering winds and a high percentage of calms play a substantial part in the local meteorology. In the coastal zone, West and South-west component is fairly strong and steady during summer, and is replaced by easterly and north-easterly winds during winter. Karwar has a high percentage of calms. In Ratnagiri and Marmagao, September is the month of calms. Bombay has 46% north-eastern winds in January and 58% in July, but does not experience calms. Surat has mild and variable north and north-easterly winds (2 m. p. h.) in the cool season, and steady south and south-westerly winds during summer; here, calms are important during transition seasons. In the Gujarat interior, Kathiawar and Cutch, winters are associated with high percentage of calms, and variable winds, which in Northern Kathiawar and Cutch exhibit greater strength under the influence of the sub-continental 'high' in the North. During summer, these parts are swept over by a strong and steady monsoonal current having a marked western component. In the plateau interior, the eastern districts of Ahmednagar, Sholapur and Bijapur experience light variable north-easterly winds, and occasional calms during the cold weather season and south-westerly winds during summer. The transitional belt on the eastern Sahyadri flank is also a region of variable winds often having a prominent easterly component in winter and a westerly one in summer.¹¹

RAINFALL. In tropical climates the importance of rainfall as a controlling factor can hardly be exaggerated. In the climatology of India, it forms the main basis for classification of climatic regions. The paramount influence of precipitation on plant life and economic development has been recognised by Schimper, Köppen and Shaw.¹² In studying the climate of Western India, it is essential to undertake a survey of the *seasonal* as well as the *regional* aspects of rainfall distribution. The seasonal distribution, as has been already seen, is primarily determined by the larger meteorological forces that govern the

10. These aspects receive detailed consideration in the chapter on Agricultural Regions.

11. Belgaum, for example, has winds, E. 35% in winter W. 52% in summer.

12. Köppen: *Die Climate der Erde* 1925, pp 87-97; 223-40. Further investigation in the climatology of India on these lines is necessary.

climate of the country. During the 'hot' season, the coasts of Western India are rainless, but over the plateau, 'spring storms' or the ante-monsoon-

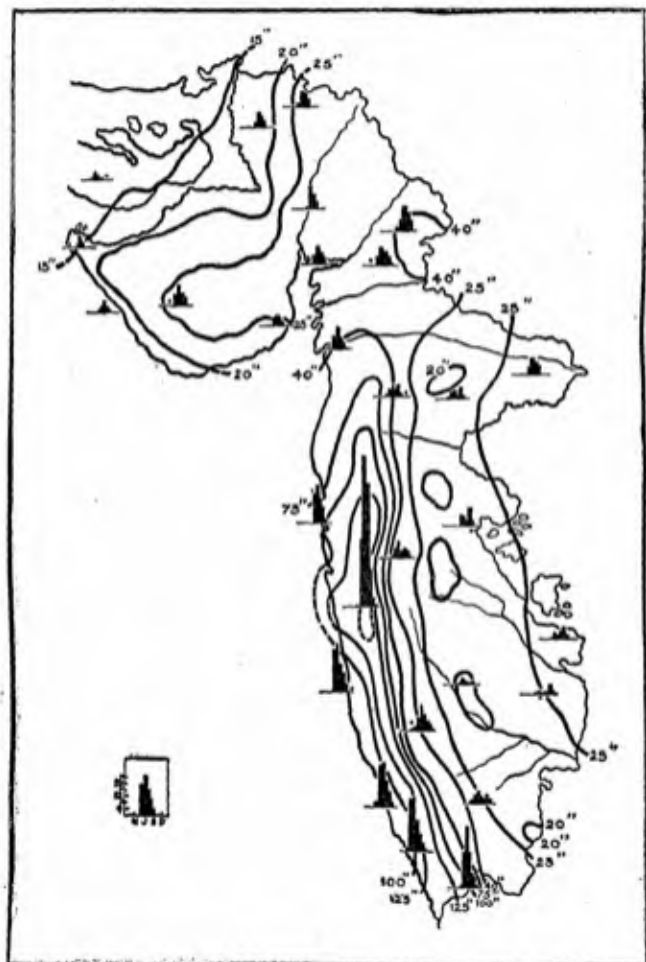


FIG. 13.— Rainfall.

General distribution and regime in representative stations.

soonal showers are important.¹³ Although the amount of precipitation is small, it has great value in the preliminary agricultural operations on the plateau. The South-west monsoon, as is obvious, is the main rainy season, when all the regions in Western India, except its eastern margin in Maharashtra and Karnatak, receive their major portion of rains. Although the winter half of the year is not associated with major precipitation, the small amount received in the central and eastern parts of Maharashtra and Karnatak as a result of October thunderstorms and the retreating monsoons, are of great importance in agriculture. For, on them depend the rabi crops.¹⁴

The regional distribution of rainfall is mainly explained by the relief of the land and the direction of the rain bearing winds. Two broad generalisations are, however, possible: Precipitation decreases in amount from the Konkan northwards to Kathiawar and Cutch; it also decreases from the coast towards the plateau interior after an intermediate increase in the Sahyadries. Thus, Karwar records an average rainfall of 120", Bombay 70", Surat 40", and Veraval 18". Mahabaleshwar with a rainfall of 260" illustrates the very wet conditions in the Ghats during the South-west monsoons. In the Ghats, this increase in rainfall is due to the intense orographical precipitation. Belgaum having 50" marks the transition between the wet Sahyadries and the dry plateau. On the eastern margin of the plateau and in the north-east highlands that separate Gujarat from Central India, rainfall records a slight increase; in the north due to relief and over the plateau because of the influences of the retreating monsoons. Godhra, which belongs to the former type, records 43", while Sholapur has 28". Along the central parts of the plateau region that lie in Maharashtra and Karnatak, there lies a narrow strip which receives an annual precipitation of less than 20" because of its unfavourable situation in respect of both the monsoons. To this general pattern of rain distribution over the plateau, the Tapti valley offers an interesting variation because of its orientation to the Arabian Sea. More humid conditions prevail in West Khandesh than in Nasik, and East Khandesh, considering its distance from the sea, receives an adequate amount of rain from the south-west monsoons. What is of particular interest is the fact that East Khandesh receives its rainfall almost entirely

13. These ante-monsoonal or 'mango' showers play an important role in local Kharif agriculture. e. g., Belgaum, has about 4" rainfall in April and May; Eastern plateau generally receives about 2"-3" rainfall of this type.

14. Rabi rainfall of the following stations is representative :

	Amadnagar	Sholapur	Bijapur
Total	22"	28-45"	21"
Rabi	10"	14"	10"
%	45%	50%	47%

from the south-west monsoon. Its more northern position with reference to the Peninsular 'Low', it would appear, explains the absence of winter precipitation. In Gujarat, rainfall is more evenly distributed on account of the level character of the land. In the Kathiawar Peninsula rainfall declines from east to west along the coast. In the highland centre its increase is due to orographical precipitation. The Halar coast marks a transition from wet to dry conditions, which in Cutch becomes complete.

HUMIDITY, ANNUAL CLOUDINESS, LENGTH OF RAINING SEASON. In general, humidity is greater all along the coast than in the interior. Here it is uniformly high all round the year, and reaches its maximum during the south-west monsoon. Over the plateau and in the inner parts of Gujarat and Kathiawar, the winter months are fairly humid, but there is a rapid transition to dry conditions in the months of spring and early summer. During the monsoonal season humidity is uniformly high all over Western India. Annual cloudiness depends on the monsoonal winds and local sea breezes.¹⁵ Coastal lands and hill ranges have greater percentage of cloud in the year. The seasonal variation in cloud is dependent on the prevailing winds. The cold weather season is associated with clear skies, but mornings are cloudy along the coast. In April, proportion of cloud is as low as 3/10 on the coast and 2/10 in the interior. July and August are the months of maximum cloudiness when the proportion reaches over 8/10, on the coast and nearly 8/10 in all other parts except in the eastern districts of the plateau, where sky is more clear. By October the amount of cloud decreases from Kathiawar to Konkan, and by November there is uniformly an open sky.

A detailed consideration of the length of the rainy season brings out some aspects of the effective elements in rainfall.¹⁶ On the coast, the length of the season diminishes from Konkan and Kathiawar. In Karwar, for example, the number of rainy days exceeds 100, Bombay has an

15. Table 4.

16. Table 5. Studying the comparative effectiveness of rainfall in Konkan and the eastern plateau, it can be seen that a considerable percentage of rain runs of waste in Konkan because of its extreme concentration during three months. It is also necessary to emphasise in this context that the rainfall normals do not necessarily give the true picture of their importance in agriculture. As has been rather pointedly observed by Sir Napier Shaw "Normals make very good geography, but poor agricultural meteorology. The sequence represented by a normal year is a sequence that has never happened and never will." From the point of view of Agriculture, the effectiveness of rainfall depends on many factors, the normal rainfall, the length of the rainy season, occurrence of rain at the right time during the agricultural season, its spacing during the season, nature of the soils and rate of evaporation etc. Improvements on the mean have been suggested by P. R. Crowe (Scot. Geog. Mag. Vol. 49) and Dr. Mathews (Scot. Geog. Mag. Vol. 52.). In view of the paramount importance of rainfall in our agricultural economy, the problem of studying the effectiveness of rainfall in different localities, is an urgent one.

average of 73 rainy days, Bhaunagar 31, Dwarka 17, and Bhuj 16. On the plateau, the number of rainy days diminishes but there is a better spread of the fall, much to the advantage of agriculture. Belgaum has 81 rainy days with a precipitation spread over from May to October. Similarly there is a better spacing of precipitation in the eastern districts although the total amount of rain is small. Sholapur records an annual normal of 28" but has 42 rainy days covering the months of June to October. Winter precipitation as is obvious explains this even spread-out in these tracts.

CLIMATE AND LAND UTILIZATION. Certain variations and special aspects of the monsoonal climate have a significance from the point of



Fig. 14.—Percentage variability of monsoons, and the famine Zone.

view of land utilization. The distribution in amount and the régime, as has been discussed in a subsequent chapter, exercise a fundamental influence on crop production, and lays down the essential distinction between the Kharif and Rabi agricultural seasons. With the wet zone, having a rainfall over 40", is associated the rice economy of the region. While

the regions of moderate rainfall have promoted a more complex crop production and agricultural economy based on millets, wheat and cotton, under the influence of soils and irrigation. Equally, perhaps more important, than the normal precipitation, are the variations from the normals in the monsoonal rains. Prolonged breaks, delayed beginning, abrupt and premature ending, and variability from year to year, impose serious handicaps on the agricultural economy. "A most important feature in determining the economical value of rainfall in any given district is its variability." Variability calculated on the basis of percentage departure from normal annual rainfall in thirty four years, is according to Williamson and Clerk, capable of two broad generalisations. The lower the average rainfall, the higher the variability tends to be; secondly, rainfall is distinctively less reliable when characteristically concentrated, than when it is well distributed in time. Thus, in Western India, the rainfall variability is least in the southern coastlands and greatest in Kathiawar and Cutch. It also increases from west to east over the plateau. Thus the incidence of famines is at its maximum in the eastern districts of Maharashtra and Karnatak, and the Northern Gujarat and Kathiawar. Among the other aspects of climate may be mentioned the influence of winter temperatures on crops like wheat and pulses, the adverse effect of veering winds on the crops during the growing and ripening seasons in Karnatak and Gujarat, the effect of winter frosts in the Nasik Basin, the influence of rainfall on the length of cotton fibre, and the intensive periodicity and concentration of rainfall along the coast and the Ghats, which very considerably reduce its value from the human point of view.

CLIMATIC SUB-TYPES. (Figs. 12 and 15) From the geographical point of view, a classification of the climatic sub-types brings out in relief the local influence of the climatic factors. Amount of rainfall and season are the main bases. But the influence of winter temperature is a consideration in certain regions. Influence of climatic factors on plant life must also be taken into account.

1. *N. Kanara and Goa.* Very heavy rainfall; over 100"; high humidity; longer S. W. monsoonal season.

✓ 2A. *North Konkan.* Transitional type between wet Konkan and dry Gujarat; rainfall between 40"—70".

2B. *South Konkan.* Rainfall between 75"—100" on the coast line; over 100" in the interior; but shorter rainy season than in 1.

✓ 3. *South Gujarat.* Rainfall between 30"—40"; greater annual range in temperature; liable to famines.

✓ 4. *North Gujarat.* Rainfall less than 30"; lower winter temperatures; variability in rainfall over 25%; greater incidence of famines.

- ✓ 5. *Dry Kathiawar*. The Halar and Sorath coastal regions; rainfall less than 25"; lower winter temperatures; greater incidence of famines; dusty landscape; transition from grassland to semi-desert conditions in the Halar coast.
- ✓ 6. *Pluviose Kathiawar*. South Central Highlands and the Cambay Gulf region; rainfall 25" and over; great range in temperature; grasslands.

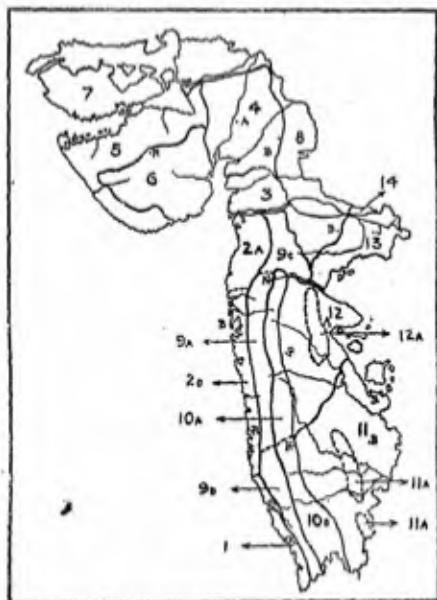


FIG. 15.—Climatic Sub-types.

- ✓ 7. *Cutch*. Very low rainfall; semi-desert conditions; landscape of erosion in arid tracts.

8. *North-east Highlands*. Rainfall 40"; humid rainy season.

9. *The Sahyadries*. Very heavy rainfall; over 150"; high humidity lower temperatures on higher slopes; 9A. Central Sahyadries 9B. Southern Sahyadries; 9C. Dry Sahyadries; Baglan tract; rainfall less than 40".

10. *The Transitional Belt*. Rainfall between 40"-70"; Transition from the humid Ghats to the dry eastern plateau. 10A. The Sub-Sahyadrian Maval Tract; rapid decline in rainfall eastwards; a

'drier' type of landscape owing to the Deccan Lavas; 10B. The 'Mallad' tract of Karnatak; intermediate rainfall, but richer vegetation; more humid conditions.

11. *Karnatak Plateau*. 11B. Rainfall from S. W. and N. E. monsoons, increasing winter maximum towards the east. Variability of rainfall over 25%; greater incidence of famines. 11A. Intermediate region of scanty rainfall; annual precipitation 20".

12. *Maharashtra Plateau*. Rainfall as in 11, but winter temperature generally lower than in 11; incidence of famines; 12A. Intermediate region of scanty rainfall.

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TABLE I
Climatological Data of Leading Stations
Mean monthly maximum temperature and mean monthly rainfall

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1 Deesa 24°14' N ASL 466' 72°12' E	f° 90.3 r 0.11	f° 95.0 r 0.16	f° 104.5 r 0.08	f° 110.4 r 0.03	f° 113.5 r 0.43	f° 110.5 r 2.18	f° 102.4 r 9.00	f° 96.1 r 8.62	f° 110.7 r 3.54	f° 101.9 r 0.41	f° 97.2 r 0.10	f° 91.2 r 0.04	f° 100.8 r 24.70
2 Bhuj 22°15' N ASL 334' 19°48' E	f° 87.7 r 0.08	f° 92.6 r 0.15	f° 102.2 r 0.12	f° 107.4 r 0.07	f° 109.1 r 1.79	f° 105.7 r 6.43	f° 98.6 r 3.24	f° 93.9 r 1.88	f° 96.1 r 0.44	f° 100.9 r 0.48	f° 95.6 r 0.04	f° 88.0 r 0.07	f° 98.0 r 14.39
3 Jamnagar 20°27' N ASL 31' 70°04' E	f° 86.1 r 0.05	f° 90.4 r 0.10	f° 99.2 r 0.15	f° 102.5 r 0.04	f° 106.4 r 0.09	f° 102.4 r 2.81	f° 96.1 r 8.49	f° 92.1 r 5.65	f° 94.5 r 2.17	f° 99.2 r 0.46	f° 95.5 r 0.01	f° 83.3 r 0.04	f° 95.2 r 20.06
4 Dwaraka 22°22' N ASL 61' 69°05' E	f° 84.4 r 0.08	f° 86.8 r 0.32	f° 93.0 r 0.20	f° 89.8 r 0.05	f° 91.1 r 0.01	f° 92.6 r 2.14	f° 90.5 r 6.03	f° 87.3 r 3.20	f° 88.2 r 1.06	f° 95.8 r 0.36	f° 93.9 r 0.03	f° 87.4 r 0.04	f° 90.0 r 13.52
5 Rajkot 22°18' N ASL 428' 70°56' E	f° 91.5 r 0.04	f° 95.2 r 0.10	f° 103.0 r 0.07	f° 107.8 r 0.03	f° 110.5 r 0.43	f° 106.8 r 4.31	f° 99.0 r 10.9	f° 93.6 r 5.71	f° 96.9 r 3.78	f° 99.9 r 0.6	f° 96.0 r 0.2	f° 90.8 r 0.4	f° 99.2 r 26.29
6 Veraval 20°53' N ASL 19' 70°26' E	f° 89.2 r 0.03	f° 90.5 r 0.05	f° 96.5 r 0.07	f° 97.3 r 0.06	f° 91.0 r 0.31	f° 84.0 r 4.41	f° 87.2 r 6.85	f° 85.0 r 7.79	f° 87.9 r 2.31	f° 97.7 r 0.65	f° 95.0 r 0.19	f° 90.7 r 0.6	f° 92.2 r 18.80
7 Bhavnagar Para 21°45' N ASL 55' 72°12' E	f° 91.7 r 0.13	f° 96.7 r 0.08	f° 104.4 r 0.10	f° 108.5 r 0.10	f° 111.7 r 0.44	f° 107.9 r 4.16	f° 100.1 r 6.72	f° 97.1 r 5.17	f° 98.5 r 3.33	f° 100.3 r 0.75	f° 97.0 r 0.15	f° 91.0 r 0.07	f° 104.1 r 21.20
8 Surat 21°12' N ASL 39' 72°50' E	f° 93.3 r 0.14	f° 98.3 r 0.01	f° 105.1 r 0.02	f° 107.8 r 0.04	f° 106.3 r 0.24	f° 101.3 r 8.34	f° 93.2 r 16.70	f° 90.4 r 7.55	f° 94.3 r 5.89	f° 98.1 r 1.75	f° 95.8 r 0.19	f° 92.1 r 0.04	f° 97.9 r 40.97
9 Ahmedabad ASL 173' 23°1' N 72°37' E	f° 91.9 r 0.02	f° 91.5 r 0.12	f° 105.6 r 0.08	f° 111.1 r 0.03	f° 113.2 r 0.43	f° 109.3 r 4.33	f° 100.4 r 11.23	f° 95.1 r 8.09	f° 99.7 r 3.73	f° 101.5 r 0.62	f° 98.1 r 0.15	f° 91.7 r 0.03	f° 100.7 r 28.83

		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
10	Bombay 18°54' N ASL 31'	87.9	88.0	91.0	92.2	92.9	93.1	88.1	86.5	87.8	92.0	91.0	88.7	92.2
	72°49' E	0.10	0.08	0.07	0.05	0.84	18.31	24.76	13.80	10.50	2.16	0.41	0.05	70.63
11	Katnagiri 16°59' N ASL 207'	94.1	93.1	92.7	93.5	93.1	92.0	87.1	65.8	86.8	95.6	95.5	84.1	91.9
	73°18' E	0.10	0.05	0.04	0.08	1.36	28.82	32.98	19.74	12.08	3.72	0.93	0.08	99.98
12	Panaji 15°21' N ASL 199'	88.4	89.2	88.4	89.4	90.1	87.6	85.0	83.9	84.2	89.6	89.8	89.2	88.1
	73°56' E	0.17	0.0	0.0	0.51	2.21	31.2	33.45	17.38	8.67	3.97	1.17	0.13	98.68
13	Marmagao 15°25' N ASL 60'	88.6	89.8	91.1	92.9	93.1	92.0	87.4	85.8	85.9	89.2	89.3	88.2	89.4
	73°41' E	0.02	0.07	0.02	0.75	2.63	29.59	31.23	15.86	9.47	3.78	1.30	0.23	94.95
14	Karwar 14°49' N ASL 44'	91.4	91.3	90.9	91.7	92.1	90.12	80.3	84.7	85.4	90.3	91.4	91.1	89.7
	74°08' E	0.05	0.04	0.0	0.52	3.23	37.03	38.06	21.38	12.03	5.63	1.92	0.23	120.12
15	Malegaon 20°32' N ASL 1430'	91.9	91.4	104.1	108.2	109.9	104.6	95.4	92.21	94.2	95.9	92.6	89.1	97.9
	74°32' E	0.16	0.07	0.07	0.11	0.88	4.33	4.80	3.21	5.89	1.91	0.61	0.79	22.23
16	Ahmadnagar 19°05' N ASL 2154'	89.1	94.6	100.9	102.6	105.3	109.8	102.1	92.3	90.5	91.9	93.2	93.2	95.5
	74°55' E	0.26	0.17	0.16	0.31	0.91	4.82	3.78	2.40	6.36	2.08	0.63	0.41	22.33
17	Poona 18°31' N ASL 1848'	90.7	95.2	102.4	105.8	105.6	99.0	88.3	86.5	90.1	93.3	91.0	88.6	94.9
	73°55' E	0.06	0.06	0.66	0.57	1.20	4.77	7.01	3.66	4.84	3.74	0.98	0.16	27.11
18	Sholapur 17°40' N ASL 1590'	92.0	98.2	103.3	108.1	109.1	104.1	96.6	94.03	94.3	94.6	91.9	89.8	97.9
	75°54' E	0.15	0.06	0.19	0.44	1.03	4.68	4.32	7.98	3.23	1.05	0.85	28.45	28.45
19	Bijapur 16°49' N ASL 1948'	90.6	95.8	101.5	104.8	105.9	100.7	93.1	93.6	86.5	92.8	90.2	89.9	95.0
	75°45' E	0.08	0.06	0.28	0.10	1.26	3.28	2.26	2.42	6.14	3.07	1.14	0.23	20.19
20	Belgaum 15°52' N ASL 2562'	87.6	93.0	97.6	101.4	100.1	91.5	81.8	80.9	84.4	87.5	80.8	85.2	89.7
	74°34' E	0.13	0.5	0.27	1.60	2.46	8.14	16.15	9.67	4.88	4.67	1.74	0.37	50.13

TABLE II
Mean Maximum and Minimum Temperature

	J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.
Bhuj	M. Max.	79.7	83.6	72.9	99.9	101.2	9.4	90.9	88.5	92.0	89.6	81.8
	M. Min.	53.8	57.1	64.8	71.3	78.6	79.9	78.2	76.3	74.7	70.6	54.9
Dwarka	M. Max.	78.3	78.4	81.9	84.8	83.1	89.2	85.9	84.6	85.5	87.2	80.9
	M. Min.	60.0	63.0	70.5	76.2	80.3	82.1	80.7	76.3	77.7	70.0	61.1
Ahmedabad	M. Max.	84.8	87.8	86.9	104.3	107.4	101.3	93.1	90.0	92.2	97.3	86.4
	M. Min.	57.7	54.5	67.2	74.4	74.2	80.9	78.5	76.8	76.1	72.4	54.3
Bombay	M. Max.	92.8	82.9	85.5	88.7	98.8	8.3	85.4	84.9	85.3	93.7	86.0
	M. Min.	66.7	67.2	71.6	75.7	79.3	78.4	76.5	75.5	76.4	72.3	68.5
Ratnagiri	M. Max.	81.2	85.8	87.1	89.4	90.8	86.7	83.9	83.6	84.1	88.1	89.2
	M. Min.	66.1	67.2	72.0	76.4	74.7	77.3	76.0	75.5	74.7	74.3	67.5
Malegaon	M. Max.	86.0	90.0	97.6	103.4	104.8	96.0	88.3	87.1	88.7	91.8	84.9
	M. Min.	52.3	54.4	68.1	71.2	75.2	75.1	73.5	71.4	70.2	66.1	52.0
Sholapur	M. Max.	87.4	92.9	99.6	104.1	104.5	75.0	81.4	88.8	88.6	90.6	85.5
	M. Min.	59.1	62.5	69.1	75.3	76.7	73.6	72.0	70.9	70.8	68.7	58.3
Belgaum	M. Max.	83.5	83.3	93.7	96.0	93.1	81.4	76.1	76.3	79.3	83.3	81.8
	M. Min.	57.8	61.4	63.7	67.1	68.2	68.2	67.2	66.4	65.5	65.3	58.4
Marmagao	M. Max.	84.0	84.8	86.8	89.3	90.0	86.6	83.8	83.4	83.4	85.5	84.9
	M. Min.	69.7	70.7	75.6	78.8	80.9	77.5	76.0	75.7	75.2	75.4	73.17

TABLE III
Number of rainy days

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Deesa	0.3	0.4	0.1	0.1	0.4	2.5	10.4	2.5	3.6	0.3	0.2	0.2	28.3
Bhuj	0.2	0.5	0.1	0.1	0.3	2.3	6.5	4.2	2.1	0.4	0.2	0.1	16.9
Dwarka	0.2	0.1	0.3	0.0	0.0	2.7	6.4	4.9	1.3	0.1	0.0	0.3	16.9
Bhavnagar	0.1	0.3	0.1	0.2	0.3	5.1	10.3	8.3	6.0	0.6	0.2	0.2	31.7
Ahmedabad	0.1	0.3	0.2	0.1	0.2	4.2	12.5	10.8	4.3	0.9	0.3	0.1	34.0
Bombay	0.2	0.1	0.1	0.1	0.7	14.7	21.8	19.2	13.0	2.5	0.7	0.2	73.3
Karwar	0.1	0.0	0.0	1.0	3.2	23.2	27.3	23.8	15.1	7.1	2.3	0.3	103.4
Malegaon	0.3	0.2	0.1	0.4	1.1	7.1	8.1	5.9	7.8	2.6	0.9	0.4	35.0
Poona	0.2	0.1	0.2	1.4	1.5	7.2	12.7	8.9	7.4	5.1	1.8	0.5	46.8
Sholapur	0.2	0.1	0.4	1.1	2.1	6.6	7.6	8.3	9.3	4.5	1.3	0.6	42.1
Belgaum	0.2	0.1	0.8	3.5	4.5	13.4	22.8	17.0	8.9	8.1	2.0	0.5	81.0
Jalgaon	0.1	0.3	0.3	0.3	0.7	7.8	13.7	12.0	7.3	1.4	0.5	0.3	45.1

TABLE IV
Normals of Relative Humidity

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual average
Bhuj (Cutch)	60	61	60	59	66	74	81	83	78	62	58	57	67
Dwarka (Kathiawar Coast)	...	69	70	75	80	81	83	85	83	78	71	67	77
Ahmedabad (Gujarat Plain)	...	47	45	43	47	53	68	81	83	78	46	47	58
Bombay (Coast)	...	72	71	74	75	74	82	86	87	87	73	72	78
Sholapur (E. Plateau)	...	47	38	33	37	45	67	74	76	61	51	49	55
Belgaum (Plateau Transitional Belt)	...	59	48	46	58	69	86	93	92	78	62	58	70

TABLE V
Normals of Cloud

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual average
Bhuj	1.5	1.5	1.9	1.3	1.2	5.2	7.3	7.3	4.7	1.4	1.0	1.4	3.0
Dwarka	...	1.5	2.0	2.2	2.3	4.9	7.8	8.0	4.4	2.0	1.2	1.4	3.3
Ahmedabad	...	1.5	1.6	1.8	1.6	2.3	6.5	8.4	5.7	1.5	1.3	1.4	3.3
Bombay	...	1.3	1.3	1.8	3.1	3.5	7.4	8.5	6.2	3.6	1.7	1.7	4.3
Sholapur	...	1.5	1.1	1.3	2.1	2.9	6.6	8.1	7.5	7.0	2.6	2.2	3.7
Belgaum	...	1.6	1.3	1.1	2.2	3.7	8.1	9.3	8.8	4.5	2.7	2.0	4.4

CHAPTER IV

Vegetation

In assessing the extent and character of the vegetation types, a factor that cannot be neglected is the long occupation of man and the consequent change on the vegetal carpet through agriculture. Descriptions of the vegetation types and their extent in the early stages of man in Western India are largely conjectural. The "Dandakaranya" of the Epics seems to include all the types prevailing, although it brings out indirectly, the existence of wide areas of scrub on a plateau tract.¹ Subsequent agricultural progress, climatic changes, loss of balance between the climate and the vegetation, and introduction of exotic species, must have altered the face of the vegetal carpet considerably. Indeed so great has been the transformation in the agricultural districts like Khandesh and Karnatak, that it is difficult to assess what the virgin flora looked like before man destroyed it. The same factor has worked in the coastal plains, and shifting cultivation—a practice dating from ancient times—has undoubtedly influenced the flora of the Sahyadries and the Satpuras.² The regional patterns of the flora in Western India and the variations and changes therein must be therefore explained in this context.

INTER-RELATION BETWEEN CLIMATE, SOILS, AND PLANT LIFE. That the type of vegetation met with in any given locality depends on the climate, the soil and the past treatment has been emphasised by the leading plant ecologists. The influence of *temperature* and *rainfall* on plant life has received a special attention in the classifications of climate proposed by Köppen and Thornthwaite.³ In the general pattern of vegetation that is evolved by environmental factors, the evolution of plant life to climatic climax—i.e., full adjustment of the plant association to the prevailing climatic type, has received a greater emphasis. The second fundamental and locally important factor is the *soil* which exerts a great influence on the type of plant association that a locality develops. An interesting fact about the soils is that they themselves and the supported plant life may undergo considerable change if the balance between the

1. According to Pargiter (J. R. A. S. 1894) the 'Dandakaranya' extended from Bundelkhand to the Krishna river.

2. Champion (A preliminary Survey of the Forest Types of India and Burma) notes several such areas in Western India.

3. Geography, Vol. XXII, pp. 258-261.

climate and soil type is disturbed for any reason by natural or human agency. Lastly, *biotic factors* particularly the human interference leave their stamp on the existing type of vegetation. Any descriptive survey of the vegetation types of Western India therefore must take into account the influence of these factors and the existing stage of development of the plant life.⁴

From the point of vegetation, Western India may be broadly divided into two climatic zones. The Wet Zone of the Konkan Plain and the Sahyadries, and the Dry Zone of the Plateau, Gujarat and Kathiawar. Temperature is uniform almost all over the region, and hence although it acts as a fundamental influence in promoting plant activity, it does not form a basis for classification except in the higher regions of the Sahyadries like the plateau tops of Mahabaleshwar and Panchgani. But as in all the tropical monsoonal countries, it is the rainfall, both in its amount and régime, that shapes the vegetation pattern of Western India. In general, it may be said that the tropical evergreen, semi-evergreen and moist deciduous flora belong to the Wet Zone where rainfall exceeds 50". In this zone, a longer rainy season and heavier rainfall produce evergreen forests in localities where soil factors are favourable. But the major part of the Wet Zone has a typical monsoonal forest having a seasonal rhythm and often displaying an intermixture of deciduous and evergreen trees on its eastern edge. The transition to dry vegetation is effected through the dry teak forests. The drier conditions of the rest of Western India, where rainfall is less than 40" and is usually between 30" to 20", produce the typical thorn forest formation. The influence of soil factors may be noted with reference to these major formations. Rain forests are often found on laterite but prefer soils derived from disintegrated schists or gneisses.⁵ The black cotton soil, as in Karnatak, produces a vegetation dominated by the Babul. In certain localities on the other hand so great is the influence of the soil, that it produces a formation which stands in contrast to its surroundings. High Level Laterite of the Sahyadries produces plant association dominated by *Xylia xylocarpa* while Low Level Laterite are, as in Konkan, are almost bare of vegetation cover. Different patterns are evolved on the sandy soils and the tidal marshes of the West Coast. Underground water supply also exerts local influence as can be seen from the Bamboo associations in the Wet Zone and the riveraine formations of the Plateau. Lastly, fire and shifting cultivation in the forested regions, forest management, and agricultural development on the coastal plains and the plateau, largely explain the stage of development of the existing vegetation types.

4. It may be mentioned here that detailed ecological surveys of type areas in Western India have yet to be undertaken.

5. Talbot: Forest Flora, p. iv.

MAJOR VEGETATION TYPES

As with the rest of the country, much ecological investigation remains to be done in this part. Talbot has made a pioneer contribution by classifying the flora into (1) Evergreen tropical flora, (2) Mixed deciduous and evergreen Konkan flora, (3) Mixed deciduous Deccan flora consisting of monsoon and thorn forest formations and (4) Desert flora. The paramount influence of precipitation is brought out in Talbot's classification. An indirect reference to the influence of soil has also been made by him. Champion's survey of the Indian Forest Types contains a valuable classification of types found in Western India. It is based on climatic influences and lays stress on edaphic factors in considering the local ecological differences. The following classification is mainly based on Champion's scheme

Formations of the Wet Zone

WEST COAST TROPICAL EVERGREEN FORESTS. Of these, the tropical wet *Evergreen Forests* are to be found in regions of heavy rainfall. "Lofty dense, evergreen forests, 150 ft. or more high characterised by the large number of species of trees which occur together. The canopy is extremely dense. Epiphytes are numerous. Ground vegetation in typical cases may be almost absent. Grass is absent. The undergrowth is often a tangle of canes, creeping bamboos and palms, which may replace high forest as *cane brakes*, along streams".* Such type is usually met with along the Western Ghats, from Kanara to Bombay. It has an extensive development in the Ghat hollows and basins and on the higher slopes, where there is a perennial water supply. In Champion's sub-classification, the Western Tropical Evergreen Forest type has its southern representative extending through the Kanara to Poona portions of the Ghats. The higher areas between 1000-4000 ft. altitude and having rainfall between 80"-200" have such vegetation cover. In the higher regions of the Ghats, and in more exposed windy areas, where climatic conditions are otherwise similar, this vegetation type assumes a stunted appearance and accordingly is grouped as "Tropical Semi-Evergreen Forests".

TROPICAL SEMI-EVERGREEN FORESTS. The transition from the true evergreen to moist deciduous types in Western Ghats is marked by the Semi-Evergreen in regions of 80"-100" rainfall, where the

6. Champion: p. 24. *Dipterocarpus indicus* (wood oil tree) is a representative tree of the evergreen type in N. Kanara; others are *Hopea wightiana*, *Vateria indica*, and species of *Artocarpus*.

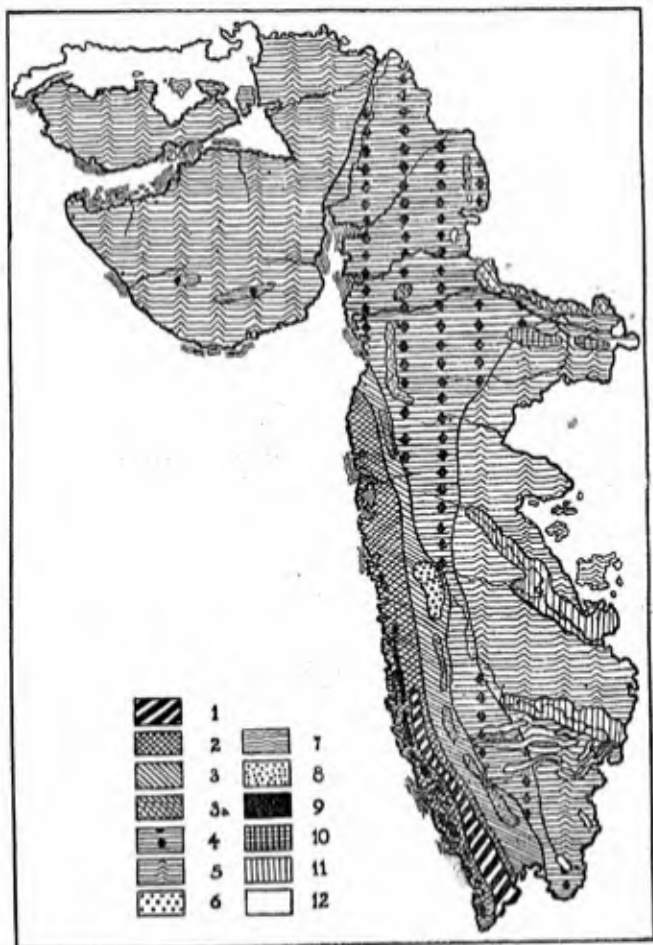


FIG. 16.—Vegetation Types.

A tentative map showing distribution.

1. West Coast Tropical Evergreen; 2. Tropical Semi-Evergreen; 3. Tropical Moist Deciduous; 3a. Dry Teak; 4. Dry Mixed Deciduous; 5. Dry Thorn; 6. Sub-Tropical Evergreen; 7. Tidal; 8. Beach; 9. Low Level Laterite; 10. Hardawickia; 11. Riveraine; 12. Residual Hills.

moisture is not adequate enough to promote a true evergreen type, and yet is capable of supporting a semi-evergreen formation. Such forest types, although available in local patches, exist on the flanks of the Sahyadries and generally in the neighbourhood of the true evergreen type. *Terminalia paniculata* is a representative tree in this formation.⁷ There is a considerable intermixture of evergreen and deciduous trees in the top, but the lower storey is mainly evergreen and is usually associated with Bamboo brakes.

TROPICAL MOIST DECIDUOUS TYPE. This is the most representative and general type of vegetation that prevails throughout the Sahyadries except in areas having evergreen vegetation. This type is characteristic of the areas having an average rainfall over 50" and marked by a fairly long and distinct dry period. Owing to the autumnal fall of the leaves, this type is grouped under the "Monsoonal Forests". "Closed forests of good height, 100-120 ft. or more, the dominant species being mostly deciduous; ... although intimate mixture of species is the rule, a relatively small number of species together, form the greater part of the canopy, and relatively pure associations are fairly met with." There are some evergreen dominant, but the lower storey in general has a greater evergreen character. Bamboo undergrowth is characteristic of this type. In these forests *Terminalias* abound. Teak is naturally the most representative and commercially the most important tree occurring in social strands. *Dalbergia latifolia* and *Xylia* have a fairly wide distribution, while bamboo species of *Dendrocalamus strictus* frequently mark the pattern of the undergrowth.⁸ This type has the best extension in the central and sub-central belts of the Sahyadries; towards its outer margins both east and west (*i.e.* in Konkan and in the sub-Sahyadrian, 'Desh' tract,) it assumes smaller dimensions and earns the name of "Pole Forests".

SUB-TROPICAL EVERGREEN FORESTS. While most of the wet zone of Western India is characterised by tropical vegetation types, altitude influences plant life in some localities like Mahabaleshwar and Panchgani, where the lateritic soils and lower temperature favour only a stunted evergreen vegetation. Although much of this type has been destroyed by

7. *Terminalia paniculata*, *Diospyros* Spp. *Lophopetalum wightianum*; the middle storey is marked by medium sized evergreen types, and by climbers and canes. Champion: p. 57.

8. *Terminalia paniculata*, (Kindal) *Terminalia tomentosa* (Nana) *Tectona grandis* (Teak) are the more representative trees. In Kanara the terminalia supplies good leaf manure to spice gardens. *Xylia* species are frequent and are usually associated with schistose, gneissic and lateritic soils. These sometimes form pure forests on old 'Kumri' lands (Talbot Vol. p. 469). Abundance of *Dendrocalamus strictus* and *Bambusa arundinacea*. Champion: p. 73.

human agency, it remains a type that is fairly distinct from its neighbours on the lower level.⁹

EDAPHIC FORMATIONS OF THE WET ZONE. In these regions where rainfall is heavy, variation in soil factors induces sharp changes in the ecology of plants. The high level lateritic soils of the Western Ghats promote a formation that is associated with *Xylia xylocarpa*.¹⁰ The low level laterite of Konkan and Kanara introduce a sharp contrast in vegetation. In these regions the dry shallow soil produces only an irregular thin scrub often dominated by *Acacia sundra* and *Litsea*.¹¹ This type very much resembles the thorn type. Along the sandy coast line of Western India *beach forests* dominated by *Casuarina* plantations occur, notably in Kanara. Strong winds, insolation, and fresh water having a saline influence, promote a Xerophytic formation. The *Casuarinas* are sometimes associated with grasses wherever there is an adequate fresh water supply from the sub-soil. *Tidal forests* occur extensively on the coastline but are prominent in the Thana Creek and in the Gulfs of Cambay and Cutch.

Formations of the Dry Zone

DRY TEAK FORESTS. Talbot names this formation as Savanna forest. In Champion's classification it is "Dry Teak". It is formed by a mixture of trees practically all of which are deciduous, and, bamboos, canes, epiphytes and ferns, are in abundance.¹² The number of species is much less than in moist deciduous types, and few tend to predominate over local areas. This type of forest has in general a park land or Savanna type of landscape in areas where the practice of burning the undergrowth is extensive. Towards the eastern margin, these 'Pole' forests merge into the thorn formation of the dry plateau. This type is fairly extensive in the Satpuras, the Panch Mahal hills and the hill ranges of Kathiawar.

THE DRY MIXED DECIDUOUS FORESTS. In the plateau tracts east of the Sahyadries, where there is a rainfall between 35-60" the proportion

9. *Eugenia jambolana* (Jambhul), *Mamecylon edule* (Iron-Wood Tree), *Actinodaphne hookeri* (Haggodgi Mara), *Canthium umbellatum* (Tupa) are common trees. Undergrowth marked by shrubs like *Scutia indica* (Chimat) and *Sirebilanthus callosus* (Karvi). Karvi in particular is a gregarious shrub much associated with lateritic soils. Talbot: Vol. II p. 331; Champion: p. 194.

10. Champion: p. 90.

11. "Irregular thorn scrub dominated by *Acacia sundra* in association with species of the dry deciduous type and an undergrowth including xerophytic evergreens." Champion: p. 178.

12. Although 'pole' teak is general, *Lagerstroemia lanceolata*, *Anogeisus latifolia* (Dindal) *Pterocarpus marsupium* (Honne), Sandal and Bamboo species mark the 'Dry teak' landscape; Champion: p. 136.

of other deciduous types like *Anogeissus latifolia*, *Terminalia tomentosa*, and *Boswellia*, increases, and hence this formation belongs to a mixed type and offers contrast to the Dry forest in its appearance and economic use. There is a great proportion of grass land area especially on the hill tops.¹³ This formation is fairly extensive on the fringes where land has not been brought under cultivation.

THE DRY THORN FOREST FORMATIONS. In the drier regions of the eastern margin, scanty and precarious rainfall promotes a vegetation of thorn forest type, dominated by *Acacia catechu*, and *Acacia sundra*. With *Acacia catechu*, are associated several other *Acacia* and thorny *Mimosae* and *Zizyphus*, whilst stunted specimens of trees of the dry deciduous forest occur scattered in varying numbers throughout, notably *Anogeissus latifolia*, *Soymida* and the like. Patches of *Euphorbia* are not infrequently met with.¹⁴ The thorn formations are in general coextensive with the dry black soil regions of the Western India plateau and with the alluvial soils of Gujarat and Kathiawar. In Cutch the vegetation assumes a still more stunted form, with an increasing proportion of the desert flora towards the north.¹⁵ Extensive agricultural development in these regions, however, has curtailed the area occupied by natural vegetation. Most of these dry forests accordingly are restricted to poor and shallow soils as in Bijapur and Ahmadnagar Districts. Here again, intensive grazing has considerably altered the ecological aspect of this vegetation type.

EDAPHIC FORMATIONS OF THE DRY ZONE. In the drier parts of Western India, the edaphic factor is prominent in influencing plant life.¹⁶ The *Hardwickia* forests are generally associated with shallow gravelly soils over the Trap and are to be found in regions of 20"-40" rainfall. Such types are more frequent in Khandesh and Nasik, but are also found on the better soils of Ahmadnagar and Sholapur. Another formation to be met with in the dry zone is the *Babul* Forests that grow in isolated patches on the black cotton soil. This type is entirely dominated by *Acacia arabica*, which is

13. These differ from the 'Dry teak' owing to the occurrence of 'drier' types like *Boswellia serrata* (Salal), *Hardwickia binata* (Anjan), *Soymida febrifuga* (Lal Chandan) and *Acacia catechu*; Dindal and Matti are representative trees, but thin undergrowth and patches of grass give such formation a 'park land' landscape. Champion: p. 137; Talbot: Vol. II, p. 482.

14. *Acacia* spp., *Chloroxylon swietenia* (Mashwal), *Euphorbia*, typically indicate the influence of dry climatic conditions and poor soils; Champion, p. 157. K. Krishnaswamy: Indian Forester: 1943.

15. Blatter (J. B. N. H. S., Vol. XVIII, p. 761) points out the influence of the scanty rainfall and the underground saline water on the Cutch flora, and the consequent high proportion of poor grass lands and scrub.

16. In Fig. 16 the edaphic formations are only roughly indicated.

markedly gregarious in habit and forms a denser cover than usual in thorn forests. Its present extension is limited, because, most of it has been destroyed under biotic influences. Natural vegetation enjoys special advantages along the banks of the rivers because seasonal floods supply a perennial sub-soil moisture to the plants. *Riveraine forests* of a dry tropical type, marked by growth of *Pongamia Glabra*, and *Terminalia* are to be found along the major river courses of the drier parts of Western India. *Inundation Babul* is another which is associated with the flooded banks of major rivers. Dense grass undergrowth is characteristic of such types. A feature common to all these formations is the greater proportion of thorny shrubs and types unpalatable to cattle.

FORESTS OF WESTERN INDIA

An important aspect of vegetation from the human point of view is its conservation and systematic exploitation. This belongs to the administrative domain of forestry which has received considerable attention in the Western countries during the present century. The present extent of the forested territory in Western India may be estimated at about 18,000 sq. miles which includes forest area of the States. It has been found difficult to obtain the data relating to the Local States, but the extent of the forested area in the states may be considered as unimportant except perhaps in the case of some Sahyadrian Deccan and Gujarat states. The following statistical comparisons therefore relate to the forestry of the Bombay Province.¹⁷ As compared to other major provinces in India, forests of Bombay occupy an important place. The total area under forest in the province is about 10,720 sq. miles of which 10,069 sq. miles is classified as reserved and the rest as protected. An area of 1600 sq. miles of reserved and protected forest is in charge of the Revenue Department.¹⁸ But in percentage of area under forests to the total area of the province it ranks fifth among the Indian Provinces. This position is equally well reflected in the net forest revenue of the province which on the average amounts to Rs. 12 lakhs per year.

THE PRESENT EXTENSION OF THE FOREST COVER. A study of the present extension of the forest cover in Western India brings out several regional characteristics (Fig. 17). Evidently the most important areas belong to the Sahyadries. Minor extensions eastward take places along the residual hills of the plateau. The Kanara Sahyadries and their transverse members occupy a leading place both in area and quality of resources. Deciduous

17. Table 1.

18. These figures are based on the 1939-40 Forest Administration Report, the year 1939-40 being taken as the last normal inter-war year.

teak associations for which the area is so well known are interspersed with fine strands of evergreen trees, and on the eastern margins, with patches

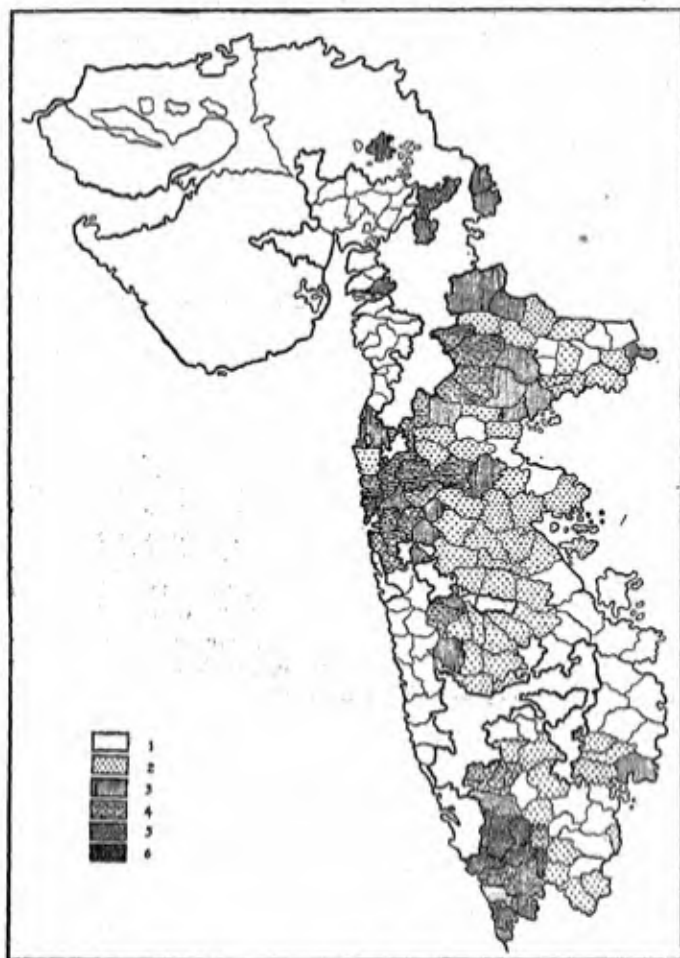


FIG. 17—Percentage of area under forests in Bombay Province.

1. Less than 5%; 2. 5-15%; 3. 16-25%; 4. 26-50%; 5. 51-75%; 6. 76-92%; State areas are shown blank and marked off by thick lines.

of grassland.¹⁹ The southern Talukas of Sirsi and Siddapur are particularly well known for the evergreen strands and the Sandalwood belts.²⁰ In the Goa and Maharashtra Sahyadries, there is a gradual deterioration in quality, due perhaps to the working of several factors. Low level laterite in Goa and Ratnagiri partly explains the poverty of these tracts.²¹ Lower rainfall and extensive destruction of the forests during the last three centuries have depleted the Maharashtra forests. The poor cover on the Konkan laterite, bare rock faces of the Sahyadries interrupted by 'tiers' of deciduous and sometimes evergreen vegetation, increasing proportion of grasslands on the eastern margin in Maval tracts, are the main features of forest landscape in the Maharashtra Sahyadries. On the dry plateau districts of Karnatak and Maharashtra, forests are nothing but local scrub and rough grasslands covering areas of poor soils in the residual hill regions.²² In the 'Dangs' region which fairly marks the northern end of the Sahyadries, forests dominate the local economy.²³

In the Satpuras and Central India Highlands there is a considerable extension of the deciduous types of forests, but the administrative boundary of the Bombay Province encloses only a small proportion. Even within the administrative boundary, the Satpuras forests yield substantial economic results and considerably influence the economy of the Bhil tribes. The Gujarat plain and the coastal zone of the Kathiawar Peninsula have very little vegetation cover that is either natural or preserved by the State. Only the highland portions of Kathiawar are covered by deciduous formations but here too the grassland cover is prominent. Mangrove swamps in the gulfs of Cambay and Cutch, and the scrub formations of the arid Cutch are extensive in area but negligible from the economic point of view.

19. Dhareashwar (Indian Forester: July 1939, June 1940, Feb. 1941) gives a good description of a part of these forests and offers suggestions to regenerate the teak and minor forests area along the Coastal Zone.

20. Gulwadi: Indian Forester, Feb. 1943; Sandal seems to show a marked preference to driver and more open patches in these forests. Thus the eastern side of the Sirsi-Siddapur tract is marked by its profuse growth.

21. The forest occupies less than 5 per cent of the total area in Ratnagiri Districts.

22. An account given by Krishnaswamy (Ind. For., Jan. 1943) of the Ramdurg Forests is fairly representative of the vegetation conditions on the residual hills. "The growth type is 'dry-deciduous.' Pronouncedly xerophytic species predominate in the growth. The forest is patchy and open on hill-tops and ridges. In sheltered valleys trees generally grow close together to form a coherent forest canopy." *Tugli, Nim, dandai* and *Babul* predominate, but the scrubs are more marked by some species of succulent *Euphorbia*.

23. Davis: Indian Forester, Vol. LXI, 6 p. 362. These forests are in a poor and undeveloped state in spite of their being near to Bombay. *Mhowra* and *Anjan* are the leading economic trees. Unhealthy climate, variable teak content, and difficulties in charcoal making seem to be the main reasons.

ECONOMIC ASPECTS. The foregoing outline survey hardly brings out the economic position of these forests, although their social import must always stand unchallenged. According to Copleston nearly 40% area of the Bombay forests is yielding poor results. Evergreen forests occupy only 13% of the total forest area.²⁴ Quite a large area is under thorny scrub even in the Wet Zone, and hence the area belonging to the monsoonal type with teak predominating is much restricted. Copleston estimates that for the population of the Province thrice the total area is necessary to make the forests economically useful and to maintain them intact as a national asset. The Bombay Forests derive their main economic advantage from timber, which yields about Rs. 34 lakhs per year. Teak is, naturally, the leading commercial link. The forests of Kanara, Dharwar, Belgaum, Satara, Nasik, West Khandesh and the Surat Dangs, produce a valuable supply of teak. The Kanara and Dharwar teak commands the best price in the market on account of its quality. Of the other trees that produce commercial timber Nana, Blackwood, Ain, and Kindal, are more important. Much of this timber goes for local house building purposes. Firewood is estimated to yield an average revenue of Rs. 3½ lakhs. Sandalwood is another major source of income yielding about Rs. 8 lakhs per year. Of the minor forest products which bring in a revenue of Rs. 29 lakhs, Pasture, Bamboos, Hirda, Apta, contribute a major share. On the whole the net profit to the Government from the forests is estimated to vary between Rs. 15 to 20 lakhs per year.²⁵

SCOPE. It is too well known to need any detailed emphasis that the forests of Western India have played a large role in the present war. It is but natural that having undergone the strain of war economy these should be a subject of post-war planning. The Bombay Government scheme comprises of plans for forest rehabilitation, communication, forest building and improvement of denuded areas.²⁶ Perhaps the Government schemes contain the regional details. Here however an outline survey of the possibilities may be attempted. A study of the forest statistics of the last seventy years shows that there hardly exists any scope for areal extension of the forest except in local areas like sandy beaches and mangroves. Development of beach forests for fuel purposes is possible along the coasts of Western India. Little economic use seems to exist at present for the products of the mangroves. With the intensive war time research that is going on in the various uses of Indian trees, it is possible that these mangroves may be made economically useful. Further, under the pressure of increasing population the swampy areas may be reclaimed, as is the

24. Copleston: *The Bombay Forests*, p. 7.

25. Table 2.

26. *Post-War Reconstruction, Bombay Province*, p. 24.

case of 'Kharepat' cultivation along the Thana and Panvel creeks. It is also likely—and desirable—that some privately owned areas, forest and grassland, may have to be taken over by the department, if a thorough going plan of improving the denuded areas is to be undertaken. Afforestation, possibly after the pattern of the American shelter bunding project, will mean such incursion into private rights in social interests.²⁷

There seems to be however a greater scope in improving the quality of the forests. Working plans development as is envisaged by the Bombay Government Plan will have to be vigorously pursued. But what is more important in this connection is not only the adoption of a long term silvicultural policy in the interests of the forest alone, but to tune it with the changing demands of the community. Teak perhaps will maintain its position in spite of the plastics. Plywood is commanding an increasing attention of the timber consumer. The increasing demand for wood fuel and charcoal by the public must not be lost sight of. In this connection a policy of developing utility plantings, as in Mysore, deserves serious consideration. Similarly selective production of certain commercial woods required for small and large scale industries will have to be a part of the forest development programme.

Admittedly, such a policy need not aim only at commercialising our forest resources. Forests, as is obvious, serve as a backbone to local economy directly through its products, and indirectly but more fundamentally by checking soil erosion and maintaining the climatic balance. Forest policy therefore must always be coordinated in the economy of its inhabitants from this larger point of view. In other words forest policy must be integrated with the larger planning policies of the region. It is not enough that forests should be scientifically regenerated and maintained. Thus, in addition to afforestation, rotational grazing supply of leaf manure and fuel, forest economy bears the responsibility of promoting local agriculture and industry, and ultimately making the forests an integral part of healthy communistic living.²⁸ Spice Gardens of Kanara and

27. Experience in the Western countries shows that greater control over land use by the state is an inevitable process in economic development. Report of the Royal English Forestry Society (1943 Sept.) advocates greater control over land use, greater coordination between departments of Forestry, Agriculture and Rural Planning and greater expenditure over Forestry. If we are to profit by the lessons from the West, there devolves a twofold responsibility on the authorities in India: (i) Effective control of land use, and, (ii) effective and efficient coordination between forested areas and their surroundings. Evidently the monetary effort cannot be judged by the immediate return from the forest product, but in terms of the real advantage to the community as a whole.

28. At present most of the Sahyadrian tracts are thinly populated and unhealthy; in some parts like N. Kanara the population is actually recording a decline. Greater expenditure therefore on communications, medical relief, state aid to farming is inevitable in order to revive these regions economically and socially. Garland (Ind. For., 1942 Nov.) argues that such revival more in terms of social welfare than in terms of economic return must form the main basis of Post-War forest policy.

Sugar Cane plantations depend vitally on the forests. Similarly development of Hydel power in the Ghats will mean a new and cheap source of power, and an advantage to the localisation of industries large and small, ancient and modern, which depend on the forests for their raw materials.²⁹ Finally, the aesthetic side of forest development will have its return in the promotion of 'tourist industry' to the many hill stations in the Western Ghats.³⁰ Perhaps possibilities of such regional developments exist in most of the forest regions of India, but that they are abundantly present in Western India can be seen from the following sample survey.

REGIONAL INTEGRATION : A SAMPLE SURVEY. With reference to a specific region of a small dimensions the term regional integration may be used to denote an effort which aims at an all round development of that area. It includes a plan to remove the existing handicaps and bring out social and economic progress. The region under study (Fig. 18) is a small basin in the N. Kanara Ghats drained by the Shalmala and its tributaries. The total area may be estimated at 392 sq. miles. Its margin and central portions are marked by local plateau features traversed by hills of irregular trend. Towards the west, the region is dominated by extremely sharp topography created by features of faulting and fractures. A major portion of the basin is under forests mostly monsoonal but interspersed with local strands of evergreen. Eastwards the proportions of grasslands increase. Broadly it may be estimated that 15% is under grazing lands managed by the Forest Department, and, a small proportion, under cultivation consisting mostly of spice gardens, rice and sugarcane cultivation, it is interesting to note, almost adheres to the nala beds. In addition to these three varieties of land use, the 'Kumri' cultivation must be mentioned as the fourth, but really an indeterminate factor, in local economy.

As is natural to expect of a forested tract, the Basin is thinly populated. The total population may be estimated at 5,500 persons, distributed in two types of hamlets: a 'gowli' village which is only a

29. As the Bombay Industrial and Economic Survey Committee point out, there is an immense field for encouraging industries old and new in these regions. Hydel power is suited to small scale undertakings. Cheap energy would revive the decaying handicrafts, and efficiently support new enterprises such as plywood and paper pulp, some of which have been already started. Jog Power Project on Mysore side of Kanara is calculated to bring considerable economic stimulus to North Mysore. Possibilities of cooperative farming in spices and sugar cane deserve immediate enquiry.

30. In U.S.A. and Europe such natural advantages are being well developed. In Southern India, Mysore is also following this policy. It is not suggested however that development of hill stations should be an argument for commercial exploitation of scenery and disfiguring nature by posters and advertisements. We are already facing such possibilities in the Bor Ghat opposite the "Duke's Nose!"

conglomeration of temporary structures created seasonally by the migrating shepherds, and a 'gardens' village which may at its best be described as a string of farmsteads running along a nala bed with spice gardens. Roadside villages like Manchikeri have slightly changed their character and economic base. But in general the average population of a hamlet of this region is between 200 to 300 persons. Human activity is dominated



FIG. 18.—Regional Integration in the central Shalmala Basin.
Cultivated area shaded. Village settlements in dots.

by the two gap towns of Yellapur (15,000) and Sirsi (10,500) situated on the margins of the Basins. Foot-paths, cart tracks, fair weather roads, of the interior and the metalled actual roads passing through Yellapur and Sirsi superimpose economic harmony in this otherwise isolated region. The Basin however is marked by several disquieting features of economic life. Forests produce an annual yield to the Department, but the population owing to a number of causes is on the decline. Area under cultivation is

stagnant and in some places declining. The Cottage industries like Sandalwood and Ivory carving, famous in ancient times, have recorded an alarming decline, and no new factors of economic life and progress have yet made their appearance.

A post-war plan for the region can be based on certain quantitative facts derived from a thoroughly detailed survey. A policy to develop better evergreen and deciduous forests in the Basin must remain the back bone of this regional plan. The Working Plans observations in this region show that there is good scope in this direction. Far more important appears to be the problem of correlating the grazing areas with the closed forests. If Garland's estimate of 2 acres per head of cattle is accepted as adequate, the grazing areas of the Basin are capable of maintaining 12,000 head of cattle with the introduction of rotational grazing, and if this is undertaken cattle industry is likely to be a prominent source of economic welfare³¹ Forests, grazing, and garden cultivation are the leading facts of economic and social geography of the Basin, but their development cannot be altogether separated from the influence of external forces. It is possible for instance to reclaim the garden areas which under the stress of the last economic depression were deserted by the Havik Community. 'Garden' villages near Yellapur, Sonda and Sirsi, hold out a promise, but the task of bringing them back to prosperity depends on building up better communications in the interior, adequate transport and marketing facilities possibly under cooperative enterprise at the Taluka Towns, a very adequate system of medical relief throughout the region, and a more flexible land revenue and forest policy. Similarly, there is an adequate scope for the development of industry. A striking natural advantage is the possibility of developing electricity from the Magod Falls, which should supply energy to large scale concerns such as plywood and paper industries and a host of smaller industries including the famous sandalwood and ivory carving industries located in Sirsi.³² The question of localisation of these large and small industrial units can be undertaken only after an exhaustive survey of the region. Certain villages offer good natural advantages for the revival of agriculture, grazing, forest occupations and industrial

31. Indian Forester : April 1940. That there is a great scope in cattle rearing can be seen from the following data relating to two type villages : (Area in acres) :

		Population	Cattle	Forest	Betta	Grazing Area
Bhartnalli	...	218	179	594	66	2214
Yekkumbi	...	221	79	578	30	1446

32. Among the several forest industries that could be suitably developed in this area the following may be particularly mentioned : Furniture, toy making, leather and leather tanning, medicinal herbs, plywood and paper pulp, cane work.

enterprise.³³ Thus, where population is recording a decline and control over Nature seems to slip out of human hands, a comprehensive plan to bring about an all round development through better forests, better agriculture, better industries and better living conditions, might prove well worth a State enterprise.

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33. Such revival of village settlements through planning is in accordance with the Gandhian Plan and other schemes of Rural Uplift. Much can be achieved, as in Germany, by a sustained forest policy to encourage permanent settlement of the rural areas to check migration to Urban areas, and to ensure a better distribution of population. "The experience of Germany and of other countries in central Europe demonstrates the advantage, from the social standpoint of having forests and forest industries widely distributed and in reasonable proximity to rural settlements. It is thus possible to have settled force of permanent workers, living in their own homes and making their livelihood partly from the forests and partly from their own farms or other occupations." Indian Forester : Jan. 1939

TABLE I

Forests: Comparative Statistics relating to Major Provinces

	Assam	C. P. and Betar	Madras	Bombay	Bengal	U. P.	Punjab
Area in sq. miles	21,495	19,571	19,232	12,926	10,169	7,305	6,700
Proportion of Forest to the total area of the Province	41.4	19.1	13.4	11.5	13.2	6.8	6.8
Net Forest Revenue in Rs. (1939-40)	5,84,000	15,07,000	4,35,000	12,30,000	6,58,000	26,21,000	31,000

TABLE II

Forestry in Bombay Province

	Area in Sq. miles Reserved	Area in Sq. miles Protected	Area in charge of Revenue Dept.	Total Revenue Rs.	Surplus Rs.	Revenue from minor Products Rs.
1900-1901	12,635	1,251	592	23,31,000	4,59,000	4,98,000
1910-1911	13,892	1,042	2,670	34,75,000	15,43,000	15,39,000
1920-1921	12,756	1,036	2,359	56,96,000	19,44,000	10,49,000
1930-1931	12,659	1,090	2,344	46,56,000	87,60,000	17,60,003
1939-1940	12,383	760	2,210	38,60,000	12,30,000	28,45,000

PART II
REGIONAL



FIG. 19.—Regions of Western India.

Regions of Western India

1A. Kanara Coastlands; 1B. Kanara Ghats; 1C. Transitional Belt; 1D. Bijapur Plateau; 1E. Lower Krishna Basin.

2A. Satmala Hills; 2B. Balaghat Uplands; 2C. Mahadev Range; 2D. Nasik Basin; 2E. Bhima Basin; 2F. Upper Krishna Basin; 2G. Maharashtra Sahyadries.

✓3A. Tapti Valley East; 3B. Malegaon Plateau; 3C. Tapti Valley West; 3D. Satpura Highlands.

4A. ✓North Konkan; 4B. Bombay Metropolitan Region; 4C. Ulhas Basin; 4D. South Konkan.

5A. Goa: *Velha Conquistas*; 5B. Goa: *Nova Conquistas*.

✓6A. ✓Tapti Mouth; 6B. ✓Gulf Coast of Cambay; 6C. ✓Central Gujarat Plain; 6D. North Gujarat Plain; 6E. ✓Gujarat Borderlands.

✓7. Palanpur Gap.

✓8A. Wadhwan Gap; 8B. Gohilwad Lowlands; 8C. Shetrunja Basin; 8D. Bhadar Basin; 8E. Sorath Coast; 8F. Dwarka Foreland; 8G. Kalar Coastlands; 8H. Morvi-Dhragandhra Region; 8I. South Central Highlands.

✓9A. Cutch Coastal Region; 9B. Inland Cutch.

CHAPTER V

Bombay Karnatak

Human interest in Western India centres around its cultural zones. Historical events, as has been seen earlier, have brought the distant lands of Kathiawar and Karnatak under a common administration. The Southern Cultural Zone comprises of the four British Districts of North Kanara, Belgaum, Bijapur and Dharwar, and the intervening "S. M. C." states (Fig. 20). It has an area of 18,500 sq. miles and a population of 4,000,000. Popularly this is known as "Bombay Karnatak", the prefix "Bombay"



FIG. 20.— Maharashtra and Karnatak

1. Area enclosing 'Greater' Maharashtra; 2 The Belt of cultural 'conflict'
3. Area enclosing 'Greater' Karnatak. (Maratha States outside Maharashtra—shaded.)

being used to indicate that part of the larger Kannada area which administratively belongs to the Bombay Province. During the last century it used be known as "the Southern Maratha Country" because of the lingering influence of the Maratha rule which ceased to exist in 1818.¹ In their growing cultural consciousness, the Kannada population now

1. J. F. Fleet was the first to draw attention to this anomaly in his "Dynesties of the Kanarese Districts."

prefers to term this region as "Northern Karnatak". There is a much disputed cultural frontier on the Maharashtra side, but within the region, there exist several features of distinction. Revival of the ancient tradition of the Chalukyan and Vijayanagar days, puristic movement in the Kannada language and a great disinclination to accept the cultural forms of Maharashtra mark the growing sense of regional consciousness of Bombay Karnatak.² To what extent the land fundamentally differs from its northern neighbours can be easily seen with reference to conditions of local geography, material and cultural developments in the past, and the growing aspirations for the future.

1. KANARA COASTLANDS

RELIEF AND GENERAL ASPECTS. Relief has introduced contrast in the environment of the western and eastern parts of Bombay Karnatak. The western part consisting of a narrow coastal plain extends from Goa to the boundary of S. Kanara. It is partly a plain of a marine denudation, but the level character of the land is severally limited by the Sahyadries and its transverse members. In fact the coast line, it would be more correct to describe, is bordered by the estuarine plains of Kali, Tadri, Gangawali, and Sharavati rivers, separated by low east-west ranges of the Sahyadries. Of the many parallel streams draining the land, these four rivers are prominent by the extent of their drainage basins and the lowlands bordering their flanks. Although the Sahyadries divide has materially affected the 'personality' of this region, the character of the coast line is more important from the local point of view, since both the development of riverine and estuarine lowlands and the prosperity of the coastal towns have been fundamentally influenced by the nature of marine erosion and deposition.

Differential marine erosion has created headlands like the Baitkul Cove near Karwar. Enclosed by such headlands are the beautiful curving sandy bays, rising from a shelving sea, for which Karwar is so famous. Dotted along the coast but within the 5 fathom line are the islands like Kurumgad, Basawarajadurga and Hog islands, presumably pieces of headlands separated by faults. Marine denudation has one special feature. The monsoons set forth a current which hugging the coast has developed sand bars across the river mouths causing much riverine deposition of alluvium in the estuaries, since all the load carried by the streams in their ungraded reaches in the Ghats above, cannot be emptied into the sea. The Kali and Sharavati estuaries in particular show extensive features of such deposition. Alluvial fans of tributaries, marshy banks and estuarine islands are typical

2. 'United Karnatak' a book published by the Karnatak Unification Conference gives more details.

features of these lowlands which in a way have been gifted by these sand bars, but not without a corresponding penalty, for, the ancient ports giving good anchorage to vessels have been gradually silting up.

The coastal lowlands find an extension along the major river valleys because of the faulted valley flanks. Agriculture has gained to some extent thereby, but far more important is the extension of the navigable

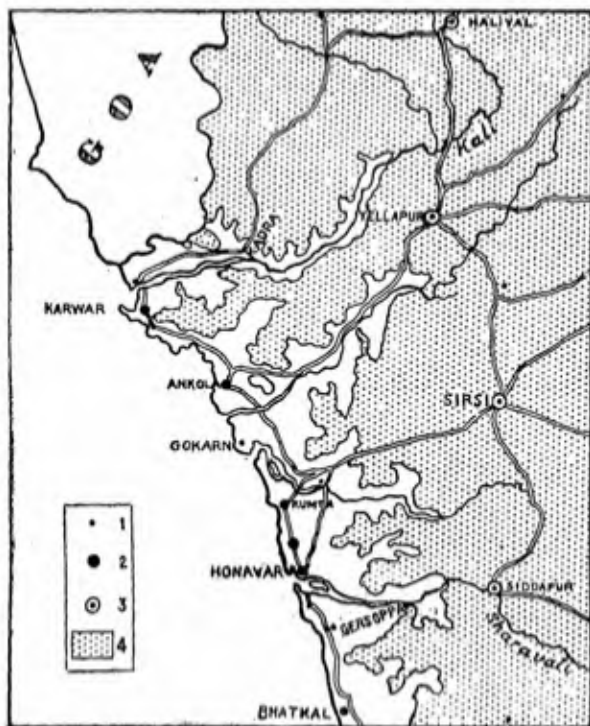


FIG. 21.— Kanara Coastlands and the Ghats.

1. Minor Townships; 2. Ports; 3. 'Gap' Towns'; 4. Land over 500 ft.

stretch of the rivers. Beyond the lowlands, the Sahyadry divide rises in a series of steps the first of which is the 'low level' laterite standing in a sharp contrast both in scenery and human geography. From the lowlands of the Kanara Coast, this 'low level' laterite with its 'slag' coloured soil appears in plateau forms. In many places, like Gokarn, it reaches the sea, but in general extends lengthwise and gains in importance south of

Honawar. Its resistance to erosion gives it a very light soil and a poor vegetation of scrub and grasses.

Interesting are the various aspects of human geography. The focus of human activity is essentially the lowlands where soil and rainfall have promoted typical monsoonal agriculture dominated by rice and cocoanuts. Over 60% of the cultivated area is under rice in all these coastal talukas. The nature of the soil determines the crop distribution.³ Cocoanuts thrive on the sandy soil (*Malalu*) along the coast, while rice can be cultivated on rich loamy patches (*Shitta*). The river mouths are characterised by rich alluvium (*Bailu*) promoting a maximum production of rice. In the upper slopes however the soil gets poorer (*Betta*) owing to predominance of laterite and is given, in the absence of irrigation, to poorer crop types like ragi. The "*Kar*"—saline marshy—lands yield rice once a year, while the best alluvium is capable of double cropping of rice. Irrigation, however plays a minor rôle except in the extreme south, owing to the rigid periodicity of the monsoonal rainfall which denies water supply in the long dry 'cold' season.

The population is dense but mainly rural.⁴ Relief severely controls the site of the settlements while nature of agricultural operations and an isolated economy favour a dispersed pattern. Agricultural lowlands of the Kali and Tadri, and the coastal plains of Ankola and Gokarn have developed a belt of maximum density which sends into the Ghats 'lobes' of equally dense population along the river valleys. Urbanisation from the point of number of towns and their size, is insignificant, since the eight coastal towns together do not have a total population over 50,000. But commercial and administrative centralisation have extended their influence far back into the agricultural hinterland.

REGIONAL. Karwar (pop. 15,300) at the mouth of the Kali dominates the whole of the Kali estuary because of its economic importance. Originally a small fishing village, three miles up the Kali, the settlement gained a new importance since the days of the East India Company's establishing a factory to export the Sonda pepper and the finest muslins of Karnatak. The

3. Sahasrabuddhe: 'Soils of the Bombay Presidency.' Bulletin of the Dept. of agriculture; p. 62.

4. The following gives an idea of the area and the density of population in the coastlands.

Taluka	Area in sq. miles.	Cultd.	Density per sq mile.
Karwar	281	54	242
Kumta	225	57	319
Bhatkal	135	29	336

All the coastal talukas have a population density of 1200 persons per cultivated sq. mile of land.

settlement grew in size and annexed (?) the neighbouring villages, but what is more, its centre of gravity also shifted shorewards where the Baitkul cove and the open mouth of the Kali gave a better anchorage to ships. Its prosperity invited the Maratha raids and the Portuguese aggression, which along with its loss of the export trade brought the town in ruins. Under the British rule it partially regained its importance but the construction of a railway line to Marmagao, originally intended to connect Karwar with Hubli, and the extension of the Poona-Bangalore Railway into Karnatak, have put the clock back so far as Karwar's prosperity is considered. The *site* of Karwar is essentially due to the estuary and the Baitkul cove, a natural harbour nearly a mile long with a depth varying between fifteen to sixteen feet at low tides. But the Baitkul cove in spite of its natural advantages is commercially not as important as the Kodibag wharf at the river mouth, where the riverborne traffic from Kadra and

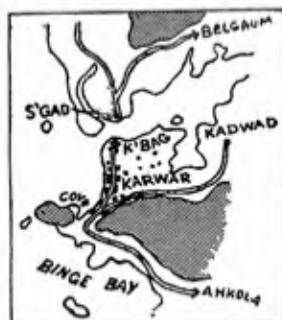


FIG. 22.— Karwar and its environs.

(Scale : 1" = 4 m.)

the road traffic from the Ghats find an outlet to other parts of Western India by coasting routes. Navigation extends up to Kadra owing to the very flat stretch of the Kali, but water borne transport of timber from the forests to the Depot at Kodibag has a greater economic importance. The importance of the Baitkul cove must be explained with reference to the present hinterland of these two ports of Karwar. The cove is really a first class harbour between Bombay and Cochin, but completely lacks economic support from the surroundings, embedded as it is in a rocky arc. On the other hand the Kodibag wharf is the focus of human activities of the Kali Basin. Had the plan to link up Karwar with Hubli materialised, this southern end of Karwar would have gained a greater importance. In the existing conditions therefore Karwar offers only a temporary refuge to coasting vessels and steamships although natural conditions are favourable

to its development as a leading port on the West Coast. On the other side of the river mouth, lies Sadashivgad standing (in ruins now) on a laterite bluff, the political 'Key' to Karwar port in the pre-British days, and flanked on the seaward side by the off shore sand bar which blocks the river mouth.

The Gudehally ranges separate the Kali basin from that of the Gangawali, a minor river having no particular focus of human activity. But the Binge and the curving Belekere Bay hold greater attraction. Off the Binge, lies the Portuguese Island of Anjidiv once the habitat of pirates. Along the coastal plain of Belekere are situated in succession the villages of which Ankola is prominent. It has earned for it the dignity of a town, but a dry creek and a limited 'hinterland' have prevented Ankola from becoming anything except a road side 'town' connecting Kumta to Karwar. To the south of the Gangawali creek, the coastline projects in the Gokarn laterite bluff, enclosing between itself and the mainland, the low lying tidal flat now known as the Sanikatta salt pans where a steady N. W. breeze in the dry season favours rapid evaporation of water for the precipitation of salt. At the end of the laterite bluff is situated the famous religious centre of Gokarn, a town of great antiquity mentioned in the Hindu epics and by European travellers in the Historical period.

A very narrow range of hillocks separates the Gangawali from the Tadri estuary in the south. The Tadri affords probably the best example of a creek enclosed and extended by a sand bar. The river is navigable up to Uppinpattan, but has a very shallow and swampy mouth. Mirjan was the sea outlet during the fourteenth and fifteenth centuries, but rapid silting made it useless for navigation, and Kumta stole its prosperity.⁵ The site of this famous port is interesting in that it is *not* situated on the Tadri creek and yet makes full use of the river valley in extending its hinterland in Karnatak through the Nilkund pass at the upper end of the Tadri. The shallow Kumta Creek is navigable up to three miles and the town is situated at the edge of this navigable limit. Export of Bellary and Dharwar cotton made it a prosperous port in the early days of the Company. It has now suffered a decline and the only vestige of its former prosperity is the name it has given to the cotton of the Karnatak. Local ('Jowar') cotton is even now known as 'Kumta' in commerce.

Marine deposition has been particularly prominent between the Kumta headland and Kasarkod point. The straight sandy coast line, except at Dhareshwar, encloses a sluggish water course which is more of a lagoon than the mouth of the Mallapur river. Alluvial deposits inside the sandbar have extended the lowlands of Karki and Haldipur. The mouth of the Sharavati is now almost completely enclosed by the two opposing sand

5. Mirjan's decline was further hastened by the frequent raids of the Mysore Power during the 18th century. Kanara Gazetteer, p. 55.

bars which hardly leave an opening of a quarter of a mile in the river mouth.* Inside the estuary, extends a large sheet of water at least two miles in width. On its northern flank is situated the ancient port of Honawar (Ptolemy's 'Onore'). Honawar grew owing to its superior site. Of all the settlements in the estuary, Honawar is the only one which is situated at the foot of the Ramtirth laterite plateau which juts out into the river and gives a good depth to the sailing vessels. The port has played a prominent rôle in history. But during recent times the silted mouth of the Sharavati and the deeper draught of the modern ships have made it unserviceable as a major port. It retains its importance owing to

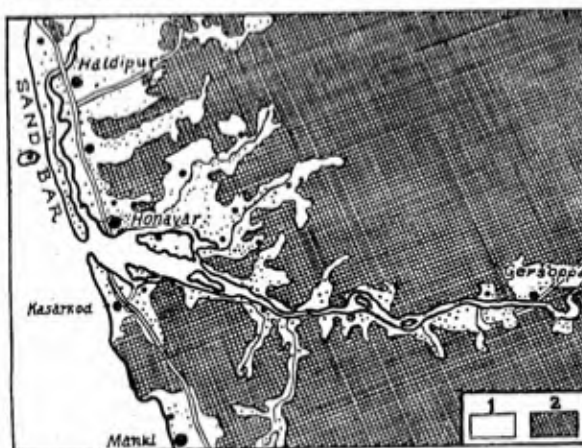


FIG. 23.— The Sharavati Basin
1. Cultivated areas. 2. Forests.
(Scale: 1" = 4 miles)

its coasting trade and as a centre of human activity in the Sharavati Basin up to Gersoppa, a small settlement situated at the navigable limit. The flanks of the river are bordered by rich rice fields and cocoanut plantations; greater rainfall and fine alluvial soil have made it a very rich region, and the river is therefore marked by a belt of continuous settlements upto Gersoppa. Economic unity is forged by the river which is the highway for small sailing ships which ply up to Gersoppa. This settlement is the place of trans-shipment connecting the Mysore and Siddapur Ghat tracts with Kanara. Export of 'Desh' products, timber, rice and cocoanuts

6. Buchanan in 1800-01 mentions the existence of a vast 'lake' at the mouth of the river, Canara and Malabar, Vol. II p. 297. Clearly, there has been much deposition at the mouth even during a span of 150 years.

and articles of luxury and cloth, find a good market in these isolated villages of Sharavati. That the region was economically very prosperous can be hardly doubted. Ruins of Jain capitals of Nagarbastikeri and Gersoppa, are an eloquent testimony.⁷ Even today the Sharavati Basin in spite of the general similarity with the Kali shows signs of greater economic production and prosperity.

South of the Sharavati creek, a laterite topography dominates the land up to the end of the Province. Wedged in between the laterite plateau on the east and a sandy coastline on the west is an irregular and very narrow strip of cultivated land devoted to rice and cocoanut production. Laterite reaches the shore at many points. The country is therefore poor and barren except round about Mavalli and Shirali where the alluvial plain is noted for its rich agriculture. Bhatkal an ancient port situated on a narrow creek is surrounded by laterite. The fortunes of this port have undergone a similar transformation like those of the other Kanara ports, but a remarkable feature is the high proportion of the Muslim population which even today brings prosperity to their homes by coastal and oceanic trading. The creek on which the harbour stands is now sand barred and can hardly be used for important shipping. But fortune may favour the port if the Mysore State receive some concessions towards its development so as to make it a convenient outlet for the export trade of the State.

PORTS OF THE KANARA COAST. It may be seen from the foregoing regional survey that the ports of the Kanara coast have a common pattern in their site, position and history. Each of these ports dominates a river basin, and for its prosperity taps in addition to local area the hinterland of the Ghats and 'Desh' through the passes. In the days of the Greek and Roman civilization many of these were important. Honawar is mentioned as *Naura* in the Greek Periplus of the Erythrean Sea (247. A.D.). Its exports consisted of pepper, pearls, silks, and imports of topaz, material like tin, lead and glass. The Arab and Persian travellers including Ibn Batuta and Abdul Razak during the 13th century mention Chitakul, Honawar and Bhatkal, as very prosperous ports importing well known Arab Horses and exporting the famous spices and other products of Karnatak.⁸ The Portuguese, as is well known, never spared any attempt to control these ports, and it was under their influence that greater markets could be gained for the Kanara products all along the Indian Coast and in the Persian Gulf. Bhatkal was famous for its rice, sugar, spices and iron exports; Mirjan and Honawar for their pepper, rice, cocoanuts and palm sugar. It was under the

7. Kanara Gazetteer, p. 284.

8. Accounts of the Portuguese writers like Varthema, Barbosa and A. da Albuquerque, are rich with details of this trade and its diplomatic importance.

Portuguese that the horse import trade to meet the requirements of Vijayanagar and Bahamani Kings reached its zenith. In 1580 De Barros mentioned it as a prosperous city. The beginning of the 18th century witnessed the settlement of the Portuguese factories at Mirjan, Honawar, Chandavar and Bhatkal. This was followed by the enterprise of the English Factories. The very prosperity of the Kanara ports invited many Maratha and Mysore invasions on the Portuguese and the English Factories. This long lasting strife, unstable political conditions in the interior, the development of Bombay and the growth of railways creating a monopoly for that city, soon sapped the traditional prosperity of the Kanara ports. As early as 1800 the ports were reported to be in decay, and were soon relegated to a secondary importance. Karwar for the time being had some prosperity, but the plateau railway connecting Marmagaoa to Bombay dissipated its earlier ambitions. Modern navigation have made the already silting harbours still more unsuitable. With their coasting trade, mainly of timber, to support them, they are now auxiliary ports of Bombay, although it is still possible to exploit the natural setting of Karwar towards making it more important.

CULTURAL ASPECTS. How fundamentally has the Sahyadry Divide separated this part of Karnatak from the rest in its historical and cultural setting may be gleaned through the historical past of the land and the leading aspects of its culture. The Parashuram Myth resurrects the Western Coast from the sea.⁹ Emigration of culturally advanced people during the century gave it a lead which earned it its former name the Havika or Haiga land. Its orientation, historically, has been always towards the sea. The spices of the interior invited an early contact of the foreigners through the ports of the Haiga country. After the Romans, came the contact of the Muslim culture from Persia and Arabia. That its vestiges even now remain in the settled Muslim population is another example of the same historical momentum. The European nations, backed as they were by sea power, were the next to impose their commercial domination on this region.

From the land, the Sahyadries prevented any attempt to consolidate a political rule although the Bahamani Kings, Marathas and Haider Ali tried it. Locally law and order was maintained—although indifferently—by the highland chiefs of Sonda and Bednur almost in the fashion of the Scottish chieftains. It is interesting to reflect upon the fact that these highlanders had their capitals in the interior and preferred to keep the Haiga territory under subjugation by developing fortified points managed by their nobles. Throughout the 17th and 18th centuries therefore the land was a scene of constant strife between major powers. The early

culture of the Chalukyan and Kadamba days survived through the rural interior when 'patches' of Muslim and Western cultures were imposed on the coastal region. The consolidation of the Portuguese power in Goa definitely created a 'political and cultural break' on the north, and not till the extension of the British power after 1818, could the land be brought under unified control. Development of cultural ideas likewise has been influenced by the north and south coastal contact. The Karnatak culture as represented by language and custom, the gift of the early Hindu rule, survives in its core, but vast transformation has taken place in one direction: the development of the Konkani language.

The fertility of the lowlands and the prosperity of the ports in the past, explain the dense population of the Haiga country. Early settlement of the region has favoured intensive cultivation of the soil and given rise to excessive subdivision and fragmentation of the holdings. Since relief prevented the various invaders from establishing a permanent foot-hold on the soil, the region is conspicuous by absence of Inam tenures.¹⁰ Pressure of population on the other hand has created circumstances favourable to rayatwari and subsistence type of agriculture. Characteristically enough the sea hardly seems to have held out any attraction to the indigenous population in the past. Most of the trans-oceanic trade was conducted by the foreigners. Only a minor percentage of population depends upon the sea fisheries. The future, however, holds some scope. With an adequate system of finance and marketing, the fisheries, mango canning, cocoanut oil and coir industries, are capable of development. The growth of the British rule in this region has produced diametrically opposite tendencies in the aspirations of the people. Coasting trade has favoured a greater contact with Bombay through the transport of agricultural and forest products, and migration of the Kanarites to the metropolitan city which, as in the case of Konkan, has brought much prosperity to this region. On the other hand, linguistic and cultural ties have a tendency to force the Kanarites back to their original fold in the south and east—towards the Karnatak of the olden days.

II. THE SAHYADRY GHATS

Beyond the 'low level' laterite plateau, lies the 'rainy country' of Karnatak, an extension of the Sahyadries with a length of 70 miles from Chandgad to Siddapur. As in other parts, the range rises in series of terraces, but the general height of the Sahyadries is lower here than

10. Inam Tenures are a good index to the political importance of a region. Talukas of Chikodi and Hukkeri, where 19% of the holdings are Inam, were highly prized on account of their rich agricultural resources, and exchanged hands several times during the Maratha days. Of course in Kanara allowance must also be made to the fact that Munro (1800) adopted a thorough policy of granting rayatwari tenures.

in north and south. In fact, this 'break' in the continuity of the chain in the Ghats is a noteworthy feature which has affected the distribution of rainfall over the 'Desh' tract of this region. The country offers an appearance of haphazardly placed hills (due to the crystalline structure) with one common feature—the level tops, from which begins the eastern plateau. The water shed has shifted to the east and is not commensurate with the crest line of the main range, a fact which is probably to be explained with reference to the headward erosion of the ungraded rivers, draining the land to the Arabian sea.¹¹ This seems to be much prominent in the case of the Kali and Bedti rivers. Features of faulting are very much in evidence along the western flank, giving rise to the rift valleys and water falls in the course of nearly all the major streams.

Forest and humidity dominate the region. The monsoonal forests with *Terminalias* and *Albizias* predominate this tract. But relief and rainfall variation have introduced plentiful differences in the vegetation types. River banks and hollows, mainly because of the abundant supply of water, favour the growth of evergreen forest, while, on the eastern edge of the Ghats there is a park land scenery consisting of stretches of grass lands interspersed with medium or short statured trees. In general, three zones may be distinguished. The *western spurs* of the Sahyadries where the red soils, partly laterite, favour a stunted vegetation of teak and bamboo forests. The *central terraced belt*, the home of the best teak forests on the outcrops of clay, slate and quartz, with stately evergreen strands of numerous species as Angeli and Devdari, along the major rivers. Beyond this are the *Sahyadry top* and the *eastern slopes* covered with stunted or pole forests and grassland patches.¹² In addition, local strands of Bamboo are present, in the forests of Sirsi and Siddapur, almost all over the region. In the south, Sandalwood trees have a greater localisation.

Natural factors have denied this region human development, except along its borders, which are marked by the capitals of the ancient Hindu rulers. Population is sparse and in many places rapidly declining. Cultivation is limited to tributary beds and flanks in the central zone and the river beds of the major streams where they open out to join the western lowlands. Crop production, in most places intensive, is restricted to rice, ragi, sugar-cane and the spices for which Kanara was so famous.¹³

11. The geomorphological features of this very interesting region merit a detailed study.

12. T. K. Mirchandani : "Kanara Forests", Indian Forester, 1940.

13. (I) Representative Crop-production of the Sahyadry Ghats :—

	Total Area	Under cultivation	Rice	Sugarcane	Spices	Other
Yellapur :	321,224	18605	7,186	185	700	2,000
Sirsi :	327,167	49859	16,717	463	3,000	3,000

(II) % of gross cropped area :—

	Rice	Sugar cane	Betelnut	Pepper	Cardamom
Yellapur :	77	1.75	10	4	$\frac{1}{2}$
Sirsi :	63	1.58	19	5 $\frac{1}{2}$	$\frac{1}{2}$

Within the region, too, rainfall has made a material difference in the agricultural conditions of the north and south. It is the more rainy south—the talukas of Sirsi and Siddapur—that is famous for its spice gardens, while the teak of the northern talukas finds a large world market on account of its quality.

SPICE GARDENS OF SIRSI AND SIDDAPUR. The present area of land under spices is about 12,000 acres.¹⁴ Siddapur has an acreage of 2600 Sirsi has 3000; Yellapur has 800. The other talukas have altogether an area of 5000. This area includes the three famous crops of the spice garden—the betelnut, pepper, and cardamom. Commercially all these crops are important and geographically they belong to the same region lying within a radius of 30 miles from Sirsi. The gardens are localised in the moist valleys of the region, having a perennial water supply and the

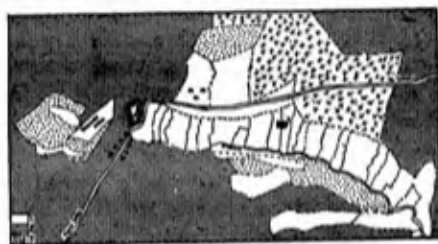


FIG. 24.—Yekkumbli, a 'Gardens' Village on the road from Sirsi to Hubli.

1. Cultivated areas with holdings indicated; 2. 'Betta' lands; 3. Minor Forest, which supplies the community with its minor needs.

The Spice Garden holdings running across the Nala bed are the product of equity in land division.

proximity of the evergreen forest—'Betta'—strands. A uniformly high temperature and moist conditions promote the growth of these crops. But success mainly depends on the soil and management. The soil, known as 'Kagdali', is derived from shales. It has a yellowish red or reddish brown colour; it is rich in mineral plant foods and is of a moist and retentive character. It is frequently revived by the 'Kagadali' earth and the green leaf manure obtained from the surroundings. Facilities for storing water and good drainage determine the layout of the garden; and it takes about twelve years to get the garden to a mature stage. Betelnut palms are raised in the shade of Banana plantations. Pepper vines are trellised on batelnut palms when the latter are about ten years old. Cardamom is grown in the inter-spaces. All these crops require a high degree of skill

14. Agricultural Returns: Kanara District. In recent years there has been a considerable decline in acreage. In 1914 the area was 23,000 acres.

and good maintenance. The yield of betelnut palm is about 1500 lbs. per acre, and the normal net profit from an acre of garden is estimated to be Rs. 260/-.¹⁵ It is well known, however, that owing to a variety of causes a steady deterioration has set in these gardens. Malaria, animal pest, slump in the spice trade are attributed as the major reasons. The Kanara public is also critical about the burden of land revenue and the restrictive policy of the Forest Department. Census figures at the same time establish the fact that gardens are no longer an attraction as they were before.

An interesting aspect of the garden lands, from the point of cultural landscape, is the way in which the layout of the garden in the valley, and the nature of agricultural operations, influence the pattern of settlements and communications. The houses are built at the junction of the Nala and the hill-side, and the village therefore takes a linear pattern, adhering to the valley side and connected by a footpath or a cart track throughout. There is hardly any central house like a *Chavdi* which holds these villages together. Each house, with its spacious verandah, cattle pen, storehouse and barn is an isolated and self sufficing unit. Only commerce establishes a contact with the world through the neighbouring towns.

KUMRI CULTIVATION. Another feature of interest in the geography of the Ghats is the Kumri or shifting cultivation carried in many forest tracts, although the practice is on a fast decline. It is what Brunhes refers to as the "*Raubervirtschaft*" of cultivation.¹⁶ Statistical data relating to its extent in the past and present is not available, but the practice dates from ancient times and the *Marathas* or *Arers* seem to specialise in it. Only at the time of tilling, sowing and harvesting, does the community visit such plots. In the dry months, patches of brush wood are cleared, and the soil is burnt with the dry wood fellings. With the setting of rains, ragi, pulse, sava or sesamum, are sown broadcast. A fence of fallen trees is raised when the plants sprout. Little care or attention is paid afterwards till the harvesting time. The crop is reaped by November and December. Another crop is raised in the next season and then the land is left fallow for the next ten or twelve years to allow it to gain a forest cover and a new mattress of decaying vegetation. Kumri cultivation in a sense is a natural evolution of an agricultural type. Extensive land, and poor economic condition of the inhabitants of the Ghat interior, seem to have promoted, in the past, this wasteful practice, which is attended by forest fires and wanton destruction of valuable trees. Yet restriction of the Kumri has caused hardship on the population who depend solely on this mode of agriculture for their subsistence.

15. 'Spice Gardens of Sirsi and Siddapur'; Dept. of Agriculture, Bulletin No. 83; p. 26.

16. Brunhes: 'Human Geography,' p. 331.

HUMAN GEOGRAPHY OF THE GHATS. Peoples of a higher civilization or those of a long settled country are known for their destructive exploitation of plant resources. It is maintained by many authorities that the ancient Dandakaranya has undergone a process of steady destruction at the hands of man. But the Ghat forests at least, inspite of the Kumri cultivation and the Maratha raids, do not seem to have materially declined, either in their extension or in the quality of their products. The reason why these forests did not suffer a wholesale destruction in the past, lies partly in geographical control and partly in the premium that the Hindu religion puts on Nature Worship. Human development could not be so rapid as to demand a greater arable area at the expense of the forest, nor was it possible to overcome the forest growth by manual effort. In many places the position remains unchanged even today. British rule has strengthened the conservation of the forests, and already complaints are usual that the forest has been encroaching on the cultivable areas of the interior. At the same time climatic conditions and a greater incidence of malaria have created here a region of negative importance. Except for its famous spice gardens, characterised by thinly populated "islands" of settlement along the roads, the cleared up tributary flanks, and the economic importance of its forest produce, the Ghats region holds very little that is of human interest.

DECLINING POPULATION. A lamentable feature of the Sahyadry Region is the declining population during the last fifty years. Enthoven notices it in the Census Report of 1901. Sedgwick carried out a systematic survey of the decline for his Census Report of 1921.¹⁷ The tendency has continued during the decades of 1931 and 1941, although certain talukas show an irregular trend in this respect. The eastern margin of the Sahyadries comprising the talukas of Haliyal, Kalghatgi and Mundgod show a fairly steady decline in population and strangely enough the wetter regions of Supa, Sirsi and Siddapur, record a comparatively lesser decline.¹⁸ The causes of this decline are complex and controversial. The local public opinion would like to attribute it to an increase in the incidence of malaria, greater restrictions of the Forest Department and a corresponding curtailing of the inhabitant's

17. Census Report 1921; Bombay, p. vi.

18. Changes in Density of Population: (percentage variation).

	1901—1911	1911—1921	1921—1931	1931—1941
Haliyal :	-19	-14	-15	-4
Kalghatgi :	-13	-15	+7	-07
Mundgod	-14	-30	+21	-11
Yellapur :	-11	-14	-10	-3
Sirsi :	-10	-14	-3	+9
Siddapur :	-9	-9	-2	+2

customary privileges regarding cattle grazing, fuel and manure supply, an increase in the animal pests necessitating a greater expenditure on fencing, and above all, the land revenue policy, which is alleged to be out of tune with the prevalent conditions of slump, in the agricultural market. Local handicaps, and a better economic opportunity outside, are explained as the main reasons for the steady exodus. Although it is not possible, for want of adequate investigation, to disengage one cause from the other, an interesting parallel movement may be witnessed in the agricultural development of their region. The total area under cultivation in the Ghats talukas has slightly declined. The percentage of "current follows" has gone up, and almost every crop has suffered a decline in acreage. Spices having an average of 9000 in 1888 have an area hardly exceeding 4000 acres.¹⁹ Cereals, fruits and vegetable have suffered the same fate, and thus, while other regions show a tendency to exploit agriculture to its very limits, in the Sahyadry Ghats there is ample evidence to show that the land is reverting to its virgin state. It is, however, difficult to indicate a causal connection between the decline in population and in agriculture. It is imperative, however, that this unhealthy trend be arrested, and the region be reinstated in a better and progressive economic setting, for which it was once famous on account of its Spice Trade.

THE TRADE ROUTES. If a region of negative importance exists, between two well developed and populated regions, the exchange needs or the settled communities compel the inhabitants to penetrate the barrier along the lines of least natural resistance.²⁰ Cultural contact follows commerce and is finally accomplished, if the barrier is not super-human, by political extension. This is true of forests as well as deserts. This tendency of human development finds an interesting corroboration in the Ghat tracts where the east and west routes connecting the lowlands with the Desh tract almost monopolies human attention. The routes through the Anshi, Devimani and Arvail passes have played a prominent role in history. Cotton and cotton goods, millets, and other plateau products found their wider markets via the routes passing first through the Plateau towns of Byadgi, Hubli, Dharwar and Belgaum, through the Ghat passes, on to Bhatkal, Honawar, Kumta and Karwar. These routes

19. Statistical Atlas 1880, p. 71. These figures refer only to Pepper and Cardamom.

20. "A pass in the high mountains is naturally suggested as a road by the general conditions of the relief. But if this pass does become a road, it needs in order to remain so, urban centres which safeguard it and which exercising their influence from afar, keep the road passing at this naturally favourable point." Brunhes. The roads of the Kanara ghats may well be compared to the German Geographers' mule trails (*Saum wegen*). In their earlier setting these roads were only used by bullock pack caravans which passed through a focal point, halted for rest, and often exchanged commodities.

therefore were important. Brunhes's observation that the more physical conditions favour the concentration of roads at a point, the more possibilities of growth a city has, explains the position of the 'gap' towns Chandgad, Haliyal, Yellapur, Sirsi and Siddapur. On the lowlands side relief severely directs the routes along the rift valleys of the major rivers up to a point where the terraces can be negotiated with low gradients. Every nodal point on such routes is marked by a small town on the plateau flank of this region.

THE GAP TOWNS. This explains the site and position of Haliyal, Yellapur, Sirsi, and Siddapur. *Haliyal* (pop. 6500) commands the Karwar-Dharwar routes which bifurcate here, to send the northern route via the Anshi pass, and thence along the Kali river, and, the other via Yellapur, Arbaal pass, and thence along the Gangawali rift to Ankola and Karwar,

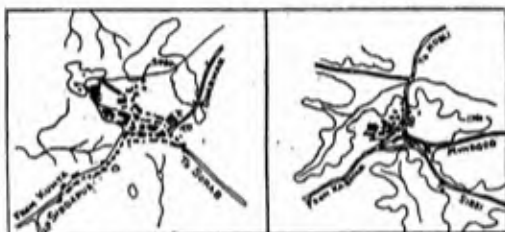


FIG. 25.—Sirsi and Yellapur.

As the contours of 2000' and 1750' show, both are situated on water sheds and control the routes of the Ghats. (Scale 1" = 1 mile)

Rice and timber trade was flourishing in the past. But never was the town as important as Yellapur and Sirsi. It lacked the 'Desh' hinterland, and part of its advantage was stolen by Yellapur. Timber trade, worked by the Forest Department and its contractors, is the only commercial function nowadays. But malaria and decline of population in the surroundings have sapped the energy of the town. *Yellapur* (pop. 15,000) is similarly situated but has a greater importance, since it is a bottle neck for the trade between Hubli and Karwar. Much of its importance is due to the transit trade and the export of pepper and betelnut grown in the surroundings. *Sirsi* (pop. 10,500) is the most famous of these gap towns since it is advantageously placed both from the point of the transit trade passing from Gadag, Ranibennur to Kumta and Honawar, and the export of the famous pepper, betelnuts and other produce of the spice gardens. The town is situated at a gap where routes from Hubli, Haveri, and Sorab (Mysore State) meet at a point, and again bifurcate in the west to reach Kumta in the north, and Honawar via Siddapur in the south. As a resting place to cart caravans,

it has developed a large market square and ancillary dwellings. The town has established a good contact with the interior of the spice gardens by fair weather roads. *Siddapur* (Pop. 3250) like Haliyal, plays a secondary role as an export centre of spice garden produce from the surrounding area of the British District and the Mysore territory. Historically, the 'gap' towns have played a significant role in commerce and warfare, but of late their commercial importance has very much declined owing to the railway development on the plateau. No longer does the 'Kumta' cotton go via Kumta. Most of the agricultural produce of the plateau is sent to Bombay by railways; the motor transport has further reduced the importance of these centres as halting places for caravans. The towns have therefore declined to grow. They remain in a straggling poverty stricken form, the vestiges of the former prosperity, depending solely on administrative importance and the export of spices.

FOREST DEVELOPMENT. This economic decline of the region has been partially arrested by the development of the Forest products by the Government. The rich teak for which the Kanara forests are so famous commands a large market. The evergreen forests are carefully preserved mainly for their supply of leaf manure to the spice gardens. The teak bearing high forests of Supa, Gund and Yellapur, are systematically worked under a scheme of fellings and regeneration. These supply the best timber and 90% of the income of the Department is due to them." While on the eastern edge of the region are the 'pole' forests where the tree growth is not so rich as in the high forests due to a lower rainfall. The fellings are transported to nearest Depots by carts. Along the steep slopes of the Kanara rivers, elephant comes in very handy in transport. In the east, most of the timber is transported to the Depot at Dandeli, where it is dressed and sent by rail to outer markets. In the west, transport is cheaper and hence most of the timber finds its way to Karwar and Honawar Depots through the Kali and Sharavati, and thence by the coasting route to Bombay. From the economic point of view Kanara forests yield an income of Rs. 16 lakhs at least every year. The forest policy of maintaining a balance between felling and regeneration under 'Working Plans' schemes, is calculated to make them a perpetual source of income to the State. The subsidiary products like myrobolans, gums, resins, bamboos and grasses also yield an appreciable income.

HISTORICAL GEOGRAPHY AND PROSPECTS. It is well known that in the study of the continents and countries, the geographer places a greater importance to the natural environment. With reference to smaller regions however, a greater emphasis is placed on man as a geographical factor.

It is usual to distinguish smaller-'geographical'-regions, therefore, with reference to facts of human geography. The Karnatak Ghat tract, however, is a natural homogeneity, which does not allow any other basis of classification of a 'geographical' region than vegetation. Forests positively and negatively have affected its neighbours as well as inhabitants, throughout the ages. So fundamental is the influence of Tree on human life that every form of activity may be traced directly and indirectly to the natural vegetation. Agriculture is conditioned by the supply of leaf manure. The dwellings have a bias towards wood. The household utensils follow the same trend, and even 'art emerges from wood. Siddapur is famous for its artistic sandal wood products. And yet rank vegetation handicaps human activity. Settlements and commerce are directed within narrow limits. The climate and vegetation prevent an increase in population. Historically this region has played a negative role as a barrier between the rich zones. Forests in the earlier civilisation had a disintegrating influence on political conditions. This thinly populated tract promoted the rule of local chieftains, who established their capitals at the edge of the forests. It is not an historical accident that the ancient capitals of Halshi, Hangal, Banawasi and Gersoppa, are situated on a line which separates the forests from the cultivated plains. In the Muslim and Maratha periods the forests were scenes of sporadic campaigns, but the movement of the troops was mainly north and south, closely hugging the tree line on the west.²² Spices and timber have relieved the indigenous poverty to some extent, but recent tendency to depopulation for whatever reason, indicate an unhealthy economic and social position. It is interesting to find, therefore, that while the evil of over population is almost taken for granted in the country, here is a region, fast receding from civilization, into the background of primitive environment. The future need not be dark however. Health measures, cooperative fencing and housing organisation, development of large and small scale industries may arrest the decline if measures are energetically organised. The forest policy instead of coming in clash with the policy of stabilising agriculture, may indeed come as a great help to the rural community. Coordination of grassland grazing and reserved forests, development of subsidiary agricultural industries, and of large scale industries like the paper industry, and encouragement to plantation agriculture can bring about a greater economic prosperity to the people. What has been achieved in the humid equatorial forests and swampy areas of the East Indies can be easily undertaken in the Karnatak Ghat tracts.

22. Correspondence in the recently published '*Pashua Dastar*' gives an idea of the conditions prevailing in these tracts. See also Khare's '*Aitihasika Lekha Sangraha*.'

Transitional Belt along the edge of the Ghats, and the dry plateau in the east.

A belt of territory about twenty miles wide running almost parallel to the Poona-Bangalore railway has all the features of transition from the Wet Karnatak to the Dry Bijapur plateau. Practically everything is transitional. Valleys open out to form the undulating surface features of the plateau. A rapid decline in the rainfall favours the growth of transitional vegetation type of medium sized trees and open grasslands. Tank irrigation is possible since narrow streams can be easily bunded.¹ A variety in agricultural production, ranging from rice the representative of subsistence agriculture, to commercial crops of tobacco and cotton, are grown.² Intensive production is possible under tank and well irrigation.

Within the region, local variation in the geological structure has fundamentally influenced the land use. The Deccan Trap of the *Northern Zone* (Chikodi and Hukeri) has introduced great variation in the fertility of the black soil.³ The low lying areas—the flanks of the Krishna and of the tributary valleys—covered with very deep black regur, yield intensive production of crops like tobacco and sugar. In no other *black soil* region of Karnatak is the rainfall so steady. Underground water can be easily tapped because of the high water table always maintained by the surrounding Trap. Sugarcane and Betel vine cultivation so dependent on good water supply, wet fodder crops, tobacco and millets, are intensively produced. Cattle breeding and dairying accordingly have a prominent place in local agriculture. Prosperous villages, high land values, frequency of litigation in civil courts, the number of times this region changed hands under the Peshwa rule and the extensive Inam tenures, indicate the agricultural wealth of the region, past and present.

But to the south of the Chikodi region, the outcrop of the Kaladgi sandstone and the 'high level' laterite near Belgaum produce poor agricultural results. Irrigation facilities overcome the drawback to a great extent. Further south, near Dharwar, Hubli and Ranabennur, conditions are almost similar, except in the Hangal region, where relief favours tank irrigation which has been extended by the Varada Canal System. Rice is

1. In Hangal taluka nearly 20% of the cultivated area is under irrigation, and the taluka has over 1000 irrigation tanks.

2. The variety in crop-production in this region may be seen from the following table (Area in acres; 000 omitted):

Population	Total Area	Cultivated	Rice	Jowar	Wheat	Bajri	Ragi	Pulses
347,000	1,729	403	230	380	105	34	37	219
Oil seeds	Tobacco	Cotton	Garden					
34	17	215	24					

3. Simkins; *Agricultural Geography of the Deccan Plateau*: p. 5.

the major crop; sugarcane is extensively grown for commerce. But there is no variety in agricultural produce as in the Chikodi region.

POPULATION: RURAL AND URBAN. A study of the population density reveals a similarity in all the transitional talukas. The density varies from 250 to 390 persons per square mile. Rural population, as in other parts of India, is predominant. But more striking is the high percentage of urban dwellers. Intensive agriculture has favoured population growth, but commercial prosperity has consolidated it to a higher pitch. Here is a strip of land which may be truly called a 'contact' zone between two different natural regions.⁴ Exchange needs of the community develop commerce along certain routes. A nodal situation on these routes gives rise to an urban settlement, where products are "trans-shipped" or exchanged. Almost every town of this Belt, exhibits a similarity in its commercial functions. Nipani and Sankeshwar in the north are depots for tobacco, jaggery and wheat products of the Dry Plateau, and for rice and timber of the Ghats. Belgaum, Dharwar and Hubli, are commercial towns transporting cotton, millets and oil seeds of the Plateau to the Kanara lowlands through their east-west roads; in the same fashion, Byadgi, Haveri and Ranebennur tap the commercial products of the southern regions including Nizams, Mysore and Bellary territory.

Even in their *site* these towns bear a remarkable resemblance. Most of these are situated at the junction of the hills and plains, an interesting corroboration to Vidal's observation that 'human' establishments preferably select lines of contact between different geological formations.⁵ Major towns like Belgaum and Hubli are situated at such junctions. They again offer a pattern in their suburban development. The suburbs have shown a tendency to grow towards the hill sides. Railway development has further added to the growth of these towns, since the hinterland has been extended on both the sides. Commercial expansion, through the east and west roads, and north and south railway, has given rise to industrial development, and administrative and social centralisation. It must be noted however, that historical momentum has also played a great part in their early development.

The twin city of Belgaum-Shahapur, (pop. 87,000) owes its development to its site and position. It controls the Plateau routes to Karwar, Goa and Malwan. Its situation on the spur of a hill, projecting into the rich Markandeya valley, has given it its urban character through advantages of defence and nodal position in commerce. As an administrative centre, it has figured prominently in the Adilshahi and Maratha History. The Belgaum Fort, situated exactly at the junction of the spur

4. Cf. Brunhes; pp. 282-283.

5. Vidal de la Blache 'Principles of Human Geography' : p. 285.

and the surrounding plain, controlled the Konkan and Goa routes and the upper Malaprabha basin. Equable temperature and suitable area for army manoeuvres have favoured the town with a military cantonment under the British Rule. Social amenities have followed in their wake, and unlike any other Karnatak town, this twin city is recording a steady increase. Dharwar (pop. 47,000) is similarly situated but it draws its inspiration mainly from administrative and social activities. Hubli, only twelve miles away, has not allowed Dharwar any commercial privilege, just as Dharwar ever since the Adilshahi days has not allowed its military and administrative importance to be usurped by Hubli. Administration and social amenities, however, have their own limits to expansion. The population of Dharwar is recording a slow increase, and unless it is supported by the industrial factor, the town, though a district place, is likely to record slow growth in future. Hubli (pop. 95,500) on the other hand has recorded a very rapid increase*. The cotton prosperity of Karnatak explains it. It is the major commercial centre of the Southern Division, and a nodal point establishing contact in every direction and controlling the routes to Karwar ports. Commerce has stimulated large scale industry. The cotton prosperity of the city dates from a long time. It promoted the handloom industry of the old Hubli in the pre-British period. But now Steam has gained greater importance. A number of ginning and pressing factories, and a large weaving mill, support a section of population. The railway bifurcation to Gadag, and administrative centralisation of the M. S. M. Railway at Hubli have given further stimulus to population growth since the railway workshop alone employs 6000 workers. The *site* of the city must be explained with reference to the northern arc of hills that surrounds the agglomeration. The original settlement of Old Hubli, is situated in the centre of the arc surrounded by a belt of low lying cultivated areas. The 'new' town has grown to the south and the east. The suburban development is proceeding, unlike that of Belgaum and Dharwar, towards east and north. This is obviously due to the enclosing arc of the red *laterite* hills which come nearer to the settlement from the east. Unproductive use of land in the shape of building activity, naturally favours an extension on less fertile soils.

How keen is the observation of Brunhes on Indian Cities may be seen with reference to these towns. The typical Indian city, according to him, consists of two distinct parts: "the closely knit native quarter, and the spacious garden area of the English officers." Any district place or

6. Growth of Hubli during the last sixty years.

1891	1921	1931	1941
35,600	69,200	89,000	95,500

7. Brunhes : pp. 183-185.

important commercial centre conforms to this description. Belgaum and Dharwar have their 'native' quarters, crowded and dirty, in the east separated from the Bungalow town, by large open spaces. Hubli has developed an 'Anglo-Indian' suburb, but on the east. Brunhes' observation, however, must be now modified in view of changing conditions. The middle class in India has, by a process of imitation, developed suburban tendencies. Suburban development is apace in all these towns; most of it a poor imitation of the Western models, but fortunately the Indian town of the future is not likely to be at any rate the crowded slums of the past.

Can climate and geology restrict urban development, is a tempting question to ask, in view of the problem that faces the three cities. The



FIG. 27—Dharwar and Hubli. (Scale 1" : 4 miles)

'Contact' towns situated at the junction of the Dharwar Rocks and the black soil plain underlain by gneisses.

The map also brings out the contrast between the villages of the South-Western region underlain by the Dharwar Rocks, and of the North-Eastern belonging to the black soil plain.

1. Villages below 500 persons. 2. Between 500-1500. 3. Between 1500-2500. 4. Between 2500-5000.

laterite and clay schists on which stand these agglomerations are incapable of retaining water for a long period. Water table therefore records great changes during wet and dry seasons. Wells have failed to satisfy the growing demands of the population. Tanks near Hubli and Dharwar too have failed to solve the problem due to rapid evaporation and silting. The long dry season, after the monsoons, creates every year problems of

water supply and sanitation. It is obvious that due to the peculiar setting of these towns in relation to relief and rainfall regions, their future growth will depend on a satisfactory solution of the problem of water supply.

HISTORICAL IMPORTANCE, AND THE PRESENT DAY ECONOMIC DEVELOPMENT. That this zone of Karnatak was a region of great historical and commercial importance, may be seen from the number of fortified towns possessing both strategic and commercial advantage. Little has been so far unearthed to indicate the extent of prosperity under the Kadamb and Chalukyan rule, but Halshi and Hangal towns belonging to this region were famous capitals then.⁸ To the Muslim rulers this was a 'border' region, to be maintained by a system of fortifications placed under the authority of the local Viceroys. Bankapur, Savnur, Kusugal, Dharwar, Hukkeri, Belgaum and Pachapur, became strategic sites. The decline of the Adilshahi rule and the rise of the Marathas gave a new meaning to this region. To the Marathas it became a 'lane' to invade the territories of their rivals in south. The north and south route through the Krishna Valley therefore was occupied by the Maratha chieftains. The increasing importance of the Transitional Zone was recognised as early as in 1700 when Abdul Raufkhan, the viceroy of the Moguls shifted his capital from Bijapur to Bankapur in order to bring a greater control over what was once the Adilshahi Empire.⁹

One can also glean into the economic prosperity of the region from events in modern history, as Shivaji's sack of Hubli in 1673, and the depredations of Nipankar Desai as late as the earlier part of the 19th century. Oriental Travellers like Della Vell and Fryer, British Army officers like Moore, and the Peshwa Records, have left for us a good account of the flourishing state of Gokak, Hukkeri, Hubli, Byadgi and Haveri. Historically then, the position of the zone in relation to its neighbours, made it an important theatre for campaigns, where the armies were in no small measure attracted by the commercial prosperity. There are many examples where railway development has affected a region adversely. The Zone, however, is fortunate in this respect since railways have created a vast hinterland on *both* the sides and have developed a transit trade north and south. Urban development therefore has been rapid during the last century as can be seen by the growth of population in most of the towns. Commerce, trade and administration have promoted social progress, and the individual citizen in rural as well as in urban areas, has definitely a better outlook on life as he is better fed, better housed, and better educated than his neighbours on either side. It would be no exaggeration to

8. Fleet : 'The Dynasties of the Kanarese Districts.'

9. Bijapur Gazetteer : p. 439.

say therefore that owing to a favourable environment, Karnatak Culture finds its most suitable expression in the Transitional Zone.

IV. THE EASTERN PLATEAU

PHYSICAL FEATURES AND ENVIRONMENT. This region has an area of 7400 sq. miles and it constitutes the largest region of Bombay Karnatak. Roughly the 25' isohyet demarcates this from the Transitional Zone; on the west the region may be said to begin just beyond the limit of the 'contact' towns. Other boundaries are mostly administrative—the Maharashtra Districts on the north, the Nizam's Dominion on the east and the Mysore on the south. The plateau has an undulating topography influenced by the Krishna and her tributaries. The Deccan Trap in the north, and the gneissic and the Kaladgi formations in the south, have introduced a contrast in relief and human geography of the plateau. Dry conditions, 'rabi' cropping, and frequent scarcity, exercise a fundamental influence over the activities and the outlook of its inhabitants.

THE DECCAN TRAP REGION. The whole of the area north of the Krishna and Ghataprabha rivers is underlain by the Deccan Trap. Its relief characters are therefore different from those of the other plateau tracts. The low extension of the Mahadeo Range ending at Bijapur acts as a watershed between the Bhima and the Krishna, but the *plateau features* are uniform all over, in their thin covering of immature soil on the top, with deeply furrowed valleys covered with rich mature 'Regur', and dotted with vegetation of stunted shrubs like the Babul. This contrast between the plateau tops and valleys is fundamental. Agricultural production, and rural settlements are restricted to valleys, while indifferent dry farming of poorer crops, and sheep grazing, characterise the plateau tops.¹⁰ *The Don Valley* in particular forms the granary of the region during normal years. Its very deep black soil cover makes it the most fertile tract of the plateau. Its economic potentialities may be seen through the more populated villages that fringe the valley. The village sites and the pattern of communications show an interesting aspect of soil and drainage control. Deep alluvial cover, intense erosion and the saline water of the Don tend to drive away the settlements from the immediate banks of the river. For very much the same reason roads adhere to the higher regions outside

10. Crop production in the eastern talukas of the plateau: (Area in acres; 000 omitted).

Population	Total area	Cultivated	Jowar	Bajri	Wheat	Pulses	Garden
1015	2524	2325	1869	83	142	121	20
Oil seeds	Cotton						
120	690						

the valley and so do, therefore, the route centres and market villages. It is the frequency of the famines, however, that introduces a great instability in the economic position of its inhabitants, and makes the land thinly populated. How far water works as a fundamental control can be seen through the very flat topped house types, the siting of the villages near perennial sources of fresh water supply, and the general poverty of the population due to famines. The plateau has therefore remained particularly backward, and a semblance of town life can be found only in Bijapur' although the settlements of Indi and Athni are minor township.

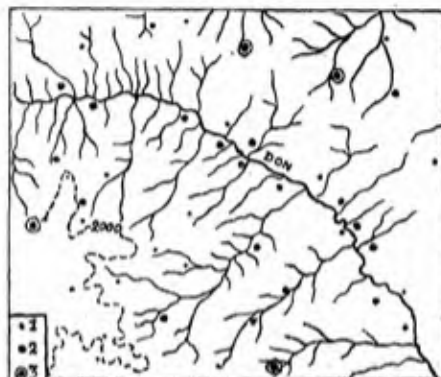


FIG. 27.— Rural settlements of the Don Valley.
(Scale 1" : 4 miles)

1. Below 500 persons. 2. Between 500-2500. 3. Market villages and route centres.

BIJAPUR (pop. 48,000) historically, and, today administratively and commercially, dominates the region, although larger villages act as subsidiary centres of commerce. The site of Bijapur seems to have been chosen by the Adilshahi rulers, because it could be easily defended from the north, since a stretch of famine stricken area separated this town from the Bhima Valley; on the south with a slope towards the Krishna it held a commanding position on the tract. Being situated at the edge of the chain of the residual plateau, it has a good underground water supply. In the hayday of the Adilshahi Empire the town could boast a population of 500,000, defended by three concentric fortified wells, and economically supported by the granary of the Don. Decay followed this prosperity, during the Maratha rule and the early British period; and at one time the city offered a deserted appearance. The transfer of District Head-quarters from Kaladgi to Bijapur in 1884 brought in some stimulus, and today the

town is recording a slow revival. Even in its present form it depicts several features of interest. The 'old' town is a straggling settlement adhering to the western fortified wall. The city in its shrinkage possibly found best conditions of survival in this area because of good underground water. The other portions of the original city have relapsed into a state of hamlets. The British administrative buildings are mostly situated in the citadel and the new urban growth quite distinct in building style and material is

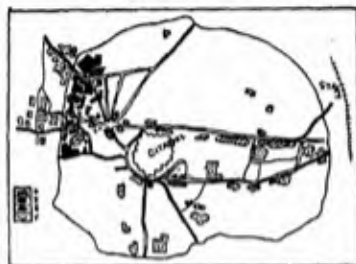


FIG. 28.—Bijapur: Old and 'New.'

1. The Outer Wall. 2. The Present Town. 3. Remnants of the Old City, now in the form of Village Settlements. 4. New 'ribbon' development along the Station Road.

finding its expression among the Adilshahi ruins outside the old core. The station road in particular is marked by such 'ribbon' development. Altogether, considering the present form of the town, Bijapur offers an illustration of a town which at present is at its best a misfit in its past setting. It cannot by itself grow within a poverty stricken region visited by frequent famines, unless it is supported by administrative centralization or patronage.

THE LOWER KRISHNA VALLEY. The Krishna valley to the south offers a strong contrast, because of the broad rich black soil plain, developed for the most part on the Deccan Trap. The river has a graded appearance. It meanders through the Trap country up to Chimulgee, where for a short stretch it traverses the quartzites of the Kaladgi series. The turbulent course of the river in a setting of wooded country is a sharp contrast to the scenery of the flat black cotton soil plain of the upper reach. Beyond these quartzite hills the valley is underlain by gneissic rocks with many intrusive dykes, the gneissic outcrop giving black soil almost similar to that of the Trap, while intrusive bosses interrupting in the shape of hillocks, the flat character of the land.

These physical variations have fundamentally affected the economic development of the Krishna Valley. In the black soil stretches, accumulation of rich soil and underground water make this a highly productive

agricultural region, but the river holds a limited scope for irrigation. Seasonal rainfall causes wide and sudden alterations in the expanse of the river, since the flood plain of the Krishna extends to a width of nearly three to four miles. In the dry season water threads out in small branches and is hardly of any use for irrigation. These wide variations in the flood and summer spans of the river give the agricultural production its specialised character. Vegetables and green fodder are raised on the immediate banks watered for a long period by the floods. Equally fundamental is the influence of this physical factor on communications and settlements. During floods the river is fordable at few points only, and the villages of the valley, presenting a prosperous appearance, are situated on a comparatively raised ground to avoid the flood waters, yet trying to be as near to the water course as possible during summer. Great rivers often create great cities, but at least in this stretch of the Krishna, such a generalisation must meet with an exception. Does the explanation lie in the fact that although the immediate banks are rich, there is no adequate hinterland to support an urban centre and that no important routes cross the river?

THE RESIDUAL HILLS OF THE GHATAPRABHA AND MALAPRABHA TRACT. The southern drainage of the Krishna Basin is characterised



FIG. 29.—Geology of the Residual Hills Region.

(Scale: 1" = 16 miles)

1. Crystalline Gneiss. 2. Kaladgi Series Quartzites and Limestones. 3. Trap.
4. Alluvium. 5. Sub-aerial.

by the outcrop of limestones, quartzites and shales of the Kaladgi series which introduce a fundamental change in the local geography. Denudation features are prominent. This region is drained by the Ghataprabha and Malaprabha which have a continuous drainage pattern from the gneissic area in the south, and the country therefore appears as a continuous chain

of low flat topped hills, with an escarpment in the south-west, and a gradual slope towards the north.¹¹ Within the region, the tributary drainage runs along lines of weakness in the beds. The existence of steep groges developed in many places by the two rivers offers additional evidence to the view that the differential erosion has worn down the gneissic area, and the drainage system has maintained its original pattern with the development of these gorges in the stretch of harder outcrops. Physical features of the region therefore stand in sharp contrast to the surrounding plain, and it is further enhanced by subaerial influences. Local faulting and cleavage in the limestones give landforms a rugged appearance, and, eastwards, towards Saundatti and Badami, this effect is enhanced by the dryness in the climate, with tallus being prominent in many places. Falls are prominent in many places, the most important being the Gokak Falls the recession of which affords yet another evidence of the antiquity of Kaladgi drainage.

While the plains are marked by the black soil that dominates the land of Karnatak, red appears to be the foundation colour of these hills. Both



FIG. 30.—The Malaprabha Gorge and the settlements of the residual hills. (Scale 1 : 4" miles)
1. Settlements. 2. Forts. Residual Hill Chain stippled.

quartzites and limestones have red or reddish grey soils in the region although the contrast even within these outcrops, is considerable. Quartzites occur almost all over the area except the region immediately surrounding Kaladgi, where limestones of the lower series predominate.

11. Foote : *Geology of the Southern Maratha Country* : pp. 75-78.

The region underlain by the quartzites is marked by a scrubby stunted vegetation, the poverty of which is still further increased by scanty rainfall. The outcrops of the soft formations in limestone and shale in the Kaladgi Basin, however, produce local areas of some fertility as in the tract lying west of Bagalkot. The extension of these Residual Hills from Nesari to Amingarh, right across the plateau, forms an interesting variation in the relief of the land and in aspects of human geography. In the black soil plain of Karnatak these hills with their escarpment facing west, low running flat tops, and gradual slope to the east and north east, stand out prominently in the landscape. These outcrops yield poor soils and are marked by scrub vegetation; but the junction of the outcrop with the surrounding black soil tract holds much that is of human importance. Well mixed soils, good water supply, suitable building material and space have promoted a string of village along this geological junction. The hilly interior is hardly inhabited except for nomadic Lamani tribes. Against this poor economic background history records interesting details of political geography. These hills form a strategic barrier between two rich agricultural tracts. Did the early Hindu kings prefer a capital in the hilly but lightly wooded region? The sites of the ancient Hindu capitals like Badami, Arsibidi, Hangal and Halsi, support this view. The reason is not far to seek. A lightly wooded hilly area offered a good defensible position and yet it could be free from the rigid control of the jungles. Badami the capital of the Early Chalukyas is admirably situated from this point of view. Similarly Gokak, Yargatti, Saundatti and Ramdurg, were important settlements in the early Hindu period. During the Muslim and Maratha rule, the belt retained its strategic importance. Nesari, Daddi, Mudhol, Wantamuri, Gokak, Torgal, Jamkhandi, Manoli, Ramdurg, Nargund, Bagalkot and Badami, were fortified points, richly prized by the Marathas and their rivals on the east and south. Historical events have left their impress on the political map. Most of these places are seats of Marathas Chieftains who, in the days of Maratha Empire, were charged with the responsibility of guarding the roads of the campaigning forces marching from Poona against the southern powers.

THE CENTRAL COTTON ZONE. South and East of the Residual Hills, lies the rich black soil plain. It is known for its cotton production. The area between the outcrop of the Dharwar and Kaladgi series is underlain by gneissic formations except in the north, where the Trap flows occupy a portion. But this geological distinction between gneiss and Trap is obliterated by the black soil covering which has brought an economic unity over the region. It is a plain with undulating surface and is drained by the Malaprabha and her tributaries. To the south, a part of the drainage belongs to the Tungabhadra. The predominant feature of the plain is its

exceedingly rich black soil which is almost identical to the Trap Regur in its agronomical characters. In the low lying tracts around Ron and Bailhongal, and the Benihalla basin, the soil is deeper and more fertile. Within the zone therefore these areas form belts of intensive production. The second favourable factor in agricultural production lies in the adequate and well distributed rainfall. The showers received from S. W. and N. E. monsoons permit great latitude in crop production.

AGRICULTURAL PRODUCTION. Agricultural production is intense but it is almost entirely dependent on rainfall. Commercial crops occupy the major cultivated area. Cotton occupies nearly 30% of the total cultivated area.¹² It is closely followed by Wheat, Jowar and Oilseeds. Soil and climatic factors are admirably suited to Cotton. After the late July or early August showers seeds are sown. The plant growth is promoted by south-west and north-west monsoon showers. Rising January and February temperature causes the boll to ripen and open out. By March and April the cotton is picked and transported to the neighbouring markets. The crop is thus held in fine balance by climatic requirements. A delayed S. W. monsoon arrests the plant growth and causes immature bolls to open out in January or February. A chance veering wind from the west in winter has a tendency to introduce diseases in the plant. And unseasonal shower in January and February damages the cotton boll. Both quality and quantity are governed by this climatic control. Soil too, it is claimed, influences the quality. Ron and Navalgund area favours the Dharwar American variety while the Trappean black soil of the Bijapur tract favours the production of Jayawant.¹³ Wheat is grown as a rabi crop because of lower winter temperature and south-east monsoon showers. In the food crops, Jowar occupies leading position. Pulses and oil seeds are raised in rotation with major crops. Almost complete absence of irrigation is a special feature of this region. Geological structure does not promote formation of a substantial underground water. It must be noted that the chemical characters of the soil are also not favourable to irrigation. Even a moderate application of irrigation produces saline efflorescence on the surface soil.

COMMERCE AND INDUSTRY. The fertility of the black soil region finds its expression in the cultural and economic geography of the Zone. The

12. Crop Production in the western talukas of the plateau : (Area in acres; 000 omitted)

Population	Total area	Cultivated	Rice	Jowar	Bajri	Wheat	Pulses
763	2205	1903	21	568	31	198	10
Oil seeds	Cotton						
662	499						

13. Indian Geographical Journal Vol. XVI p. 219.

pattern of rural settlements is influenced by the soil and water supply. Most of the land is too fertile to be used for unproductive purposes. Villages tend to grow on relatively harder and infertile patches where fresh water supply could be available either through wells or tanks. Mud walls and flat house tops reflect the dry climatic conditions. Most of these are large sized prosperous villages. Cotton rules the land. The pattern of cart tracks connecting the village with local centres of commerce and of metalled roads which bring the rural interior in contact with the principal towns is influenced by cotton. The crop has a tradition of prosperity in Karnatak. Under the Hindu and Muslim rule in Karnatak, its famous handloom products found a wider market through the Kanara ports. Even in these days of machine competition the wide distribution of handlooms shows how deep rooted is the cotton tradition which finds its best expression in the Guledgud Ilkal tract.

GULEDGUD ILKAL TRACT. East of the residual hills stand a group of small sized towns at the junction of the gneiss and sandstone series. These are the famous handloom centres of Guledgud and Ilkal. Amingad, Hungund and Kamatgi. Guledgud and Ilkal are its major centres.¹⁴ The industry specialises in sarees and khans which have a good home market. So far competition of manufactured product is not keenly felt because the rural public shows a preference to these handloom products. This localisation of a cottage industry within a radius of twenty five miles from Guledgud is a striking feature of the regional geography. The reason probably lies not only in the abundant supply of cotton, which is a common feature all over the Karnatak Plateau, but in the adequate supply of fresh water and vegetable dyes drawn from the neighbouring jungle scrub. In the past at least, these factors must have acted as powerful influences to localisation. A similar geographical setting explains the localisation of handloom industry at Rabkavi and Pachahpur both situated at the junction of Kaladgi quartzites and the Deccan Trap. Historical momentum explains their survival in the present century. A large section of weaving population, middle men and Karkhandars characterises such centres.

In larger towns this indigenous industry finds some scope under the aegis of commerce. Betgeri has a weaving population of 3000. Almost every taluka centre can boast of handloom production to some extent. But now a days cotton is more prized for its export than for its consumption.

14. S. V. Telang: Report on Hand Loom Weaving Industry in Bombay Province, p. 22.

	No. of Looms	Daily production in Rupees
Bagalkot :	350	2500
Kamatagi :	800	5000
Ilkal :	3025	1700
Guledgud :	3500	10,000

by local handicrafts. The village ginning mill is an evidence of the far reaching influence of the commercial arm. Such mills are increasing in number. Ron, Navalgund, Nargund and Bailhongal, with their cotton markets and cotton presses act as primary collecting centres while Gadag and Hubli are the rail heads for cotton transport to Bombay and Sholapur.

TOWNS. The twin town of Gadag-Betgeri (pop. 56,000) stands out prominently in the cotton producing area. A religious importance probably explains the origin of Gadag as urban centre. With the development of the Kanara ports it must have gained in importance as a halting place for pack bullocks and carts on the Bagalkot, Haveri and Sirsi route. Betgeri has grown into a town because of its handloom industry and on that account it possesses an individuality of its town. With the construction of railway, Gadag has had a rapid development as a commercial centre and a railway junction. The absence of a road bridge across the Tungabhadra creates a "bottle neck" at Gadag for trade across the river with the Nizams Dominion and the Bellari District. Gadag dominates the southern cotton tract and cotton dominates the town and its annual rhythm of activity. Its cotton market is the focus of urban life. By the beginning of the picking season the town bursts into activity, commercial agents flock in; there is a flow of cart caravans bringing cotton into the market from the agrarian interior; the market bustles with activity and the rest of the town follows the pace; ginning mills and cotton presses lying idle for a long period are now set to work; cotton finds its way out in a compact and well graded form to the metropolitan city of Bombay for export, or to other cities like Sholapur for industrial consumption. By the middle of June this activity is at its zenith. The town accomplishes its major ambition and settles down to a quiet life during the next eight months of the year. Cotton thus controls the urban rhythm, but ancillary activities arising out of administrative and social centralisation maintain to some extent its urban character throughout the year. A study of recent census statistics shows that of all the urban centres of Bombay Karnatak, Gadag-Betgeri shows signs of greater vitality. Bailhongal (pop. 10,800) is a replica of Gadag in its function as a cotton centre. It taps the cotton yield of the Malaprabha valley. It has a regulated cotton market, but depends on Belgaum for transport of cotton to Bombay. Gokak (pop. 13,600) is situated at the northern end of the cotton zone. It forms an outlet for the cotton producing areas of the Ghataprabha and Malaprabha valleys. In the past it was a well-known centre of fine handloom products and toy industry. Modern industry has made its appearance near the town with the development hydro-electric power from the Ghataprabha Falls. The Gokak Mills consume an appreciable percentage of local cotton and give employment to a large number of workers. The river has been bunded at

Dhupdal and the mills are situated just near the falls. In spite of the large catchment area extending over 16 sq. miles, the seasonal nature of the river and the steady silting up of the Dhupdal tank prevent a regular and adequate supply of water to the mills. Hydro-electric energy has to be sometimes supplemented by coal in summer.

THE DAMBAL HILLS. In contrast to the rich agricultural region of central Karnatak, stands the region of small bare topped hills west of Gadag. These are the Kappat Hills. The irregular and bare aspect of this hilly area is due to gneissic formations that have been subjected to much disturbance. Topography shows features of extensive metamorphism. The highly silicious nature of the parent rock has given an almost poverty stricken appearance to the countryside. The ash grey sandy soils are singularly infertile and the scanty rainfall heightens this effect. Most of the area consists of a wild grazing land and the only attraction in the past was the gold bearing strata near Gadag. The gold content however seems to be small and extracting the yellow metal therefore has not been an economic proposition in spite of the prospecting done in the last century.

CULTURAL GEOGRAPHY OF BOMBAY KARNATAK. 'Karnatak' as the land of the Kannada speaking people generally includes the southern districts of the Bombay Province together with the intervening Southern Maratha States, Mysore, south western area of the Nizam's Dominions, the Coorg, South Kanara and Coimbatore parts of the Madras province. As one authority observes: "The frontier line thence goes northwards through the dominions of the Nizam as far as Bidar where it turns almost due west on about the 78th degree and further southwards so as to include the south eastern portion of Jath and Daphalapur. Kanarese is also spoken in the extreme south east of Satara Agency and in the south of Belgaum and further to the west in Kolhapur in almost as far as the town of Kolhapur. The line thence turns southwards following the Ghats to about Honnawar where it goes down to the sea. In North Kanara, Kanarese is the official language of the district. It is the principal language of the South Kanara with the exception of the southeast corner. The frontier line thence coincides with the frontier of Mysore. Kanarese dialects are also spoken in the Nilgiris and the language has been brought by immigrants to Madura and to Central Provinces. Linguistically and culturally then Karnatak forms a major province of India having a population of well over a million." Culturally there is unity over this region but political events have disintegrated the land.

The Northern or Bombay Karnatak from this larger point of view forms an 'outer' zone of this major unit. After the Adilshahi rule however the fortunes of Bombay Karnatak were linked with Maharashtra

and the tie continues to the present day because the Peshwa territories were taken over by the Bombay Government in 1818. But in history, Northern Karnatak has contributed much to the cultural development of the major unit. Kannada owes its early development to the Chalukyan and Kadamba rulers who belonged to this part of Karnatak. This cultural growth found a strong foothold in the teachings of Jain, Veershaiva and Vaishnav leaders. The rule of the Vijayanagar Kings came as a unifying influence over these parts which had already found a common linguistic and cultural bond. But with the rise of the Bahamanis there began a steady disintegration, and the sense of unity was practically lost under the influence of the Nizam and the Maratha Powers. By the beginning of the 17th century the Krishna-Tungbhadra Doab became a theatre of war for its neighbours. Regional culture was threatened from the north and the east. Anarchy and plunder depleted the economic sources of the land. Extension of the Maratha rule meant an imposition of a new language and culture. The 18th century witnessed the settlement of Maratha chieftains in strategic areas and the rich plains of the Doab. Under the Marathas certain administrative improvements took place; but the economic welfare of the people was hardly a subject of their attention. Nor were conditions, it must be said in fairness to them, favourable to a stable government when they were faced by rivals like Hyder Ali and Tipu. But Marathi became the language of administrative routine. Maratha customs and manners found a ready acceptance. Of all the warring races of India, Marathas have displayed a greater tendency to carry their culture with the sword. The 18th century thus witnessed a partial 'Marathisation' of the land and this influence persisted throughout the 19th century.

Law and order, and spread of education, however, have again created an awakening in the Karnatak population in regard to their cultural past. It has made them aware of their sharp differences with their northern neighbours in language, religion, customs and tradition. Political domination by Maharashtra and a sense of frustration in their economic aspirations have strengthened this reaction. This has found its expression in the growing demand for unification of Karnatak.¹⁵

From a purely regional point of view two zones of clash may be noted. The northern strip of the country which has a great admixture of Marathi and Kannada speaking people, and, the major towns which, being the citadels of Maratha administration, were largely settled by the Maratha administrative classes and their local followers. In Belgaum for instance there is the majority of Marathi speaking population within the urban limits. Along the northern boundary of Belgaum and Bijapur Districts the argument naturally is for the assimilation of the strip in

Bombay Karnatak. In the towns—parts of which have become 'islands' of Maharashtra culture—this linguistic difference often leads to controversy and clash. It is interesting to notice here that the Maratha influence true to its mountainous environment has percolated further south in the Sahyadries and along the Kanara Coast. The Ghat Talukas of Belgaum and Dharwar Districts contain an appreciable percentage of Marathi speaking population.

With the cultural awakening of the Northern Karnatak, the Kannadigas have risen to new aspirations. Their grievance is administrative, economic and cultural. Placed as they are in the distant corner of the Bombay Presidency a feeling seems to prevail in this region that the needs of Karnatak are being overlooked by the administration. Poor economic development and inadequate famine relief are explained in this context. Culturally there is a feeling that nothing is common between them and the people of Maharashtra. Language is different. Religion offers few points of similarity. Aryan tradition rooted in Maharashtra history and religion stands in contrast to the Dravidian culture of Karnatak in its present form as influenced by Jainism, Veershaivism and Vaishnavism. In no small measure is environment responsible for the difference in outlook and values in life exhibited by the Marathas and Kannadigas. In fact, geographical setting has produced two contrasty types: the Maratha race which was partly dependent on agriculture but mainly on campaigns, and the peace loving Kannadigas of a rich agricultural land. Activity and aggression mark the Marathas as a race while acceptance of the inevitable and a sense of hospitality are the two leading traits in the Kannada character.

With these differences made more keen during the present century, the people of Northern Karnatak look elsewhere for a revival of their ancient culture and tradition. The 'Unification' movement is embedded in this setting. The knowledge that people with the same cultural history and linguistic affinity reside across the political frontier on the south has made the demand more keen. The people of this part have now turned their back to the rest of the Bombay Province and look up to their southern neighbours in the realisation of their common cultural goal. Recent social and political thought in Karnatak has made great strides in this direction.

And yet administrative and economic ties bind the region closer to Bombay. A hundred years rule from Bombay and the development of communications have enabled the metropolitan city to annex this region as its economic hinterland. Cotton prosperity of Bombay Karnatak is dependent on Bombay and on the textile industries of Western India. So is the pattern of commercial and industrial finance and organisation. It would be difficult to claim that without the aid of the Bombay Port and

the market of Western India, Northern Karnatak would be able to maintain its economic progress. The very geographical position and the political history of Northern Karnatak have placed it in a peculiar position: it owes a cultural allegiance to the south and an economic allegiance to the north.

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Karnatak Area and Population

Administrative Units		Area in sq. miles	Total Population	Kannada Population
1. Bombay Karnatak	...	18,874	3,469,000	2,500,000
2. S. M. C. States	...	8,765	2,067,000	599,000
3. Mysore	...	29,458	6,557,000	4,578,000
4. Coorg	...	1,593	168,000	65,000
5. Nizam's Dominion (Districts of Gulbarga, Raichur, Lingsugur and Bidar)	...	16,743	3,175,000	1,620,000
6. Madras Province :				
(i) Bellary	...	5,714	969,000	533,000
(ii) S. Kanara	...	4,045	1,372,000	244,000
7. Outlying Talukas :				
(i) Madagsira (Dist. Anantpur)	...	446	97,000	100,000*
(ii) Hosur (Dist. Salem)	...	1,182	196,000	165,000*
(iii) Krishnagiri (Dist. Salem)	...	687	213,000	
(iv) Kollegal (Dist. Coimbtore)	...	1,076	105,000	296,000*
(v) Sholapur (Dist. Sholapur)	...	849	272,000	63,000*

*These are district figures, but they give an idea of the Kannada element in the border regions of Karnatak.

CHAPTER VII

Maharashtra

With an area extending over 50,000 sq. miles and a population of 20 millions, Maharashtra forms the biggest cultural unit in Western India. It comprises of three well marked physiographical divisions: the Konkan, the Maharashtra Plateau, and the Khandesh. But it has a cultural extension beyond, towards the east in C. P., the Berars and the Marathawara territory of the Nizam's Dominions.¹ It is a land of great antiquity. Its early Hindu rulers the Shilahars, Chalukyas and Yadavas have played a conspicuous part in history. But it was only with the growth of the Maratha Empire that the region became famous. The origin of the word Maharashtra still remains controversial.² But there is little disagreement as to what it connotes in the territorial extension of the land. 'Maharashtra' includes the Marathi speaking tracts of C. P. Berar and the Nizam's territory in addition to the regions in Western India. Like Karnatak, here too linguistic affinity receives a greater emphasis in the aspirations of the inhabitants. But within this larger area, can be discerned the cultural 'core': the original Maharashtra, the region between the Narmada and Krishna rivers, and enclosed on the east by a line joining Jalgaon, Aurangabad and Sholapur. The eastern boundary for obvious reasons is not a dividing line but a zone of transition. The area demarcated by these boundaries therefore has been taken into the regional survey of Western India because it represents the core of Maharashtra. Language and culture have general similarity all over the tract. But physiography introduces many changes within it. This is particularly brought out by the fundamental dissimilarity between the Konkan tract and the Maharashtra Plateau. Indeed the contrast would justify the argument that Konkan is essentially a distinct unit as is claimed by certain authorities. From a regional point of view then, three broad divisions may be made on the basis of physiography: 1. The Plateau of Maharashtra lying east of the Konkan Coastal Plain and in our study extending eastwards up to the administrative boundary of the province. 2. The Khandesh Basin drained by the Tapi and her tributaries and bounded by the Satpuras on the

1. The 'Greater' Maharashtra occupies nearly 8% of the total area of the country. Marathi speaking population is estimated to be slightly over 20 millions.

2. 'Maharashtra' has been etymologically interpreted as 'Maha Rashtra', 'Malle Rashtra', 'Maha Rattas'. See 'Maharashtra Shabdakosha' Vol 3, pp. 2-4. Also S. V. Ketkar: 'Pracheen Maharashtra' Shatwahan parva: Ch. 4.

north. 3. The Konkan Coast, extending from the Damanganga river to the Goa boundary and bordered by the Sahyadries on the east.

THE MAHARASHTRA PLATEAU. The plateau of Maharashtra has an extension of nearly 30,000 sq. miles. It is almost coextensive with the districts of the Central Division excluding the West and East Khandesh. It also includes the Maratha States. From the point of relief it belongs to



FIG. 31.— The Maharashtra Plateau. (Scale 1" : 32 miles)
River Basins and Forts.

three drainage areas separated by residual hill chains. The northern portion is drained by the Godavari. The Bhima drainage in the centre claims the major area. The south-eastern area is drained by the Krishna. Trap topography predominates. Along its eastern edge the Sahyadries offer a continuous backbone to the plateau. The average height of the divide is about 2500 ft. above sea level. But in many places the basaltic core reaches heights of 4500 and 5000 ft. as in the Tryambak and

Kalsubai hills. Along their western flank, which abuts the Konkan Plain, the Sahyadries offer much dissected appearance. The general slope of the plateau is towards the east and south-east and the Trap strata are almost horizontal. This explains the gradual nature of the slope which is of great significance in the study of the geomorphology of this region. Geologically, except for the local appearance of infra-trappean beds, the region belongs to the Deccan Lavas. Local faulting and erosion, on the western flank, and mainly erosion on the eastern, have given the Sahyadries an appearance of a chain of plateau tops girdled by terraces and broken in many places by local weakness in the rocks. Like the 'mesas' of the Spanish scenery, almost all the Sahyadry 'peaks' are such separated plateau tops.

Differential erosion explains the Trap topography of the Plateau area. Basalt resists erosion and stands out in bold vertical forms. But softer structures, joints and places of weakness, facilitate erosion.³ The whole of the plateau is therefore marked by the continuous chain of the Sahyadries which send towards the east its minor members in the form of low flat topped hills many of which merge into the plain in the neighbourhood of the administrative boundary of the Bombay Province.⁴ Such are to mention the more prominent, the Satmala, Balaghat and the Mahadeo ranges. The plateau in its landforms therefore offers a great contrast to that of Karnatak. In the latter, there emerge the harder formations of the Kaladgi and Dharwar series. The Maharashtra Plateau on the other hand is traversed by several continuous hill chains which spread out like the fingers of the palm from the Sahyadry Core.

This erosional topography has its interesting counterpart in the pattern of drainage. The transverse hill ranges demarcate the basins of the major rivers. In this respect these form the subsidiary watersheds. The very gradual fall in height towards the east makes lateral erosion more important. This tendency is further promoted by the almost horizontal position of the Lava beds. Regional grading of the streams is therefore frequent. Such are the broad basins of the Godavary and the Bhima and their tributaries. The meandering course of these rivers and the wide drainage areas support this view. It is only in the proximity of the Sahyadries crest line, where the gradient is steep, that there is vertical erosion as evinced in the steep valley of the Krishna which has a longitudinal course from her source waters near Wai to Miraj. To a lesser extent all other rivers conform to this pattern in the neighbourhood of the

3. Although the geomorphological features of the Deccan Lavas Region await detailed investigation, from a cursory glance of the Purandhar area it is clear that the varying mineral composition of the Lavas influence the local topography and vegetation.

4. It seems to be the peculiarity of the Sahyadries, that almost every transverse range of the plateau originates in an area marked by great heights like the Saptashring Peaks or the Mahabaleshwar Plateau.

Sahyadries proper. In a region of unequal slopes rapid changes in drainage and extensive river capture may be expected. It seems fairly certain that the main watershed is receding to the east. Such recession is particularly prominent in the Baglan tract.

THE MAHARASHTRA UPLANDS. The composition of the Trap rocks and the long established differential erosion have a great significance in the human geography of the Plateau. As a result of these two influences on landforms, the Plateau is marked by two regions of great contrast, the dissected highland chains traversing the region from west to east, and the low lying, well wooded and cultivated, basins. From the point of view of land utilisation, soil makes this fundamental difference. That the Trap wears into a rich black regur is a well known fact of the geography of the region. Relief influences the soil in so far as low lying areas develop mature and fertile soil, while the higher zones having steep gradient are characterised by immature and poorer types. Usually the hill tops and flanks have a cover of this soil which carries a poorer type of vegetation, mostly grass. In many places basalt gives the land, particularly along the terraced walls of the hills, a bald and bleak appearance though the softer soils gives a quick variation in the scenery. Where the soil is exceedingly silicious, it is almost barren, and the land becomes a stretch of monotonous bare undulating plateau as in the Khatav-Man region in the south. In many areas weathering has developed a stony or 'badland' topography singularly devoid of vegetation and life, as is particularly seen in the Purandhar-Jejuri Ranges.* Thus the control of relief is fundamental in almost all the hill ranges of the Deccan Plateau. But equally important is the distribution of rainfall. That relief and rainfall govern human geography of the Maharashtra plateau can be seen from the following regional discussion.

THE SAHYADRIES AND THE MAVAL. The whole of the Sahyadry tract from the Girna Hills to the Goa Border may be included in this region. In the north it is locally known as the Dangs and in the south it is frequently described as the Dongri region. The transitional strip on its eastern flank is known as the Maval. The watershed rises in a series of steps from the Konkan side. On the side that faces the Konkan coastal plain, it is well wooded with monsoonal vegetation, except in the lower reaches of the valleys where agriculture supercedes it. Even in the monsoonal flora local variation is plentiful. Ghat terraces and valley floors generally contain rich stands of teak and other representative types.* But evergreen strands are rare. Higher valley slopes promote a poorer type of

5. Poona Gazetteer : pp. 12-13

6 In these tracts forests fall into mixed evergreen woods and teak coppice categories.

forest. Very often it is scrub. Wherever basalt outcrops in a massive form there is practically no vegetation cover. The reason for this variation lies partly in the nature of the soil but mainly in the amount of moisture either available underground or directly through the rainfall. As elsewhere, vegetation becomes poorer with a decreasing rainfall. But irrespective of rainfall, contrast is introduced by the low level and high level laterite, which on account of the poverty of the soils, offer a very barren and desolate appearance. The watershed proper is marked by a series of plateaus varying in size. Many of them command the pass routes to Konkan and have thus played a political role in Maratha history as fortified points. Almost all famous Maratha forts belong to this region.⁷ In modern times however climate seems to be a greater attraction. The plateaus of Panchgani, Mahabaleshwar and Matheran are now hill stations where the holiday crowd from Poona and Bombay rushes to find a haven during the oppressive summer. But here too, man is fastidious

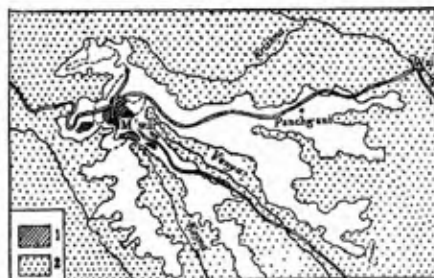


FIG. 32.— The Mahabaleshwar Plateau.

1. The Malcolm Peth : (' Native ' Quarters). 2. Land below 4000 ft.

in his tastes and willingly abides by the dictates of Climate. Both Mahabaleshwar and Matheran have a floating population. Mahabaleshwar (pop. 5000) attracts the holiday makers only in summer. For the remaining part of the year it leads a dormant life. Matheran (pop. 2700) on the other hand has a more steady flow of visitors all round the year. It taps the Bombay crowd owing to its vicinity to the Metropolis. But its lower altitude makes summer conditions rather unattractive. It therefore mainly depends on week-end and October holiday crowds. Compared to Mahabaleshwar it is a lesser hill station because of the limited plateau surface and a warmer summer climate. Panchgani (pop. 3700) is almost a suburb of Mahabaleshwar, but has a stable urban tone on account of its

7. Rajmachi, Lohagad, Sinhgad, Pratapgad, Panhala and Vishalgad, are some of these leading forts. See Fig. 31

more easterly position and lesser rainfall. It is situated on a plateau twelve miles east of Mahabaleshwar. At Mahabaleshwar the rainfall is over 260 inches per year. In the neighbourhood of Panchgani, it rapidly declines to 60 inches. The latter has accordingly a greater 'open' season. A pleasant climate although not so invigorating as that of Mahabaleshwar, and a large expanse of plateau not distant from Wai, have attracted a more stable population of holiday makers. Educational and social amenities have strengthened this urban bias, and even during the rainy season the town does not lose its urban character. As an appendage to Mahabaleshwar, Panchgani is a commercial centre and accommodates 'the hill station' loving population of Mahabaleshwar after the autumn exodus from that place.

Possibilities of 'tapping' this climatic advantage are almost unlimited in the Sahyadries, because the plateau tops are well wooded and climate not so oppressive nor so malarious as that of the Karnatak forested tracts. The limiting factor is the economic support from the cities beyond the forests. It would not be unfair to say that a hill station by its very nature is a parasite. In the absence of prosperous urban agglomerations in the neighbourhood, evolution of such hill stations is hardly possible. Places like Lonavala, Malavali and Sinhadgad are developing as sanatoria, but their future depends on the growth of towns in this zone.⁸

HYDRO-ELECTRIC DEVELOPMENT. Growth of the metropolitan city of Bombay and the city of Poona have also added a new importance to Maval. Electrical energy has been developed from three different areas : the Andhra valley, Lonavala and Mulshi, by bunding the small valleys draining to the south-east. The impounded waters are diverted through the tunnels to the generating stations at the Konkan foothills. The power thus generated supplies energy to Bombay and Poona through a grid.⁹ Heavy initial expenditure has been justified by the progress of the Tata enterprise, but the annual variations in the rainfall, evaporation of the banded water and silting up of the tanks continue to be major problems. The development of the Hydro-electrical project itself with its

8. In South, several other hill stations like Panhala and Amboli are capable of such development.

9. Of the 1100 million units of energy produced in Bombay Province nearly 600 million units are developed by the three Tata Hydro-electric Companies, and 50% of the Tata energy is utilised for industrial purposes. The following table shows the output and the capacity :

Installation	Station	Installed capacity	Ultimate capacity
Tata Power	Bhira	87,500 Kwts.	105,000 Kwts.
Andhra Valley	Bhivpuri	48,000 Kwts.	64,000 Kwts.
Tata Hydro	Khopoli	48,000 Kwts.	48,000 Kwts.

pattern of pylons gives a modern touch to this region. Similar projects are being undertaken in the southern Maval zone around Bhore and Kolhapur.¹⁰ The future of Hydro-electrical power however, although natural conditions are fairly favourable, is now dependent on industrial development and the State initiative.

Poverty of the soil makes agricultural production of this zone negligible. Rice and Ragi are the two staple crops. The region is thinly settled except around the Tryambak hills and Wai, and hill stations like Mahabaleshwar.

THE EASTERN RANGES. Branching off from the Saptashring peaks, the Satmala Hills separate the drainage of the Godavary Basin from that of the Tapi. The western part of this hilly region is transitional and is mainly covered by monsoonal forests, but in the centre, scrub and grasslands mark the landscape. The eastern end on the other hand is fairly

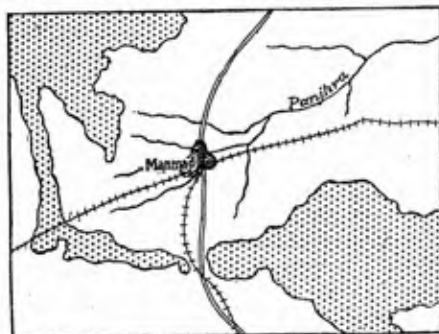


FIG. 33. — Manmad: A 'Gap' Town of the Plateau.

wooded. The chain forms a barrier between the Khandesh and the Maharashtra Plateau since it rises over a thousand feet above the surrounding lowland area. Its strategic value was recognised by the Muslim and Maratha rulers as can be seen from the string of forts built on its flat tops. Chandor and Nandgaon in particular had a greater importance since they controlled the only easy gap affording a route between the Hindustan and the Déccan (Dakhan).¹¹ Chandor was a commercial centre also. The Manmad branch of the G. I. P. Railway has

10. The Bhatghar Dam provides electric energy to the Nira canal region. In Kolhapur, work has been started at Radhanagari which is calculated to provide energy for domestic use, and for Sugar and Bauxite industries. The Koyna Project of the Tatas, oddly enough, is still in its embryonic stage in spite of its great potentialities.

11. Nasik Gazetteer : p. 430.

given urban importance to Manmad which was a mere village fifty years ago. But the Satmalas are still a barrier to communications and the importance of the Nandgaon pass continues. South of the Thal Ghat, runs the second line of hills, from the Kalsubai point (5425 ft.), the highest peak in Western India, to a distance of forty miles. This chain is almost similar in aspect and settlement types to the Satmalas. From the vicinity of the Bhimashankar heights there emanates the Harishchandragad Range, which on its eastern edge is known as the *Balaghat Range*. The range separates the Bhima Basin from that of the Godavary. Its central portions are not so high as the Satmalas and the plateau tops do not present a formidable appearance. Scrub and poor grassland characterise this stretch, but towards the east owing to the influence of the north-east monsoons, vegetation improves its appearance. East of Ahmadnagar therefore the valleys are well wooded. The centre of human interest is naturally the town of Ahmadnagar (pop. 69,000) which owes its urban development primarily to its commanding position near a pass in the Balaghat Range.¹² Bahamani rule brought prosperity to the settlement, but then there set in a decline which only recently has been arrested due to the British administrative and cantonment development. The hills marking the south-western boundary of the Bhima Basin have a similar position, but inadequate rainfall and siliceous character of the underlying rock have made these parts a region of scrub and almost completely bare hills. Both the Purandhar and Mahadeo Ranges offer a considerably dry landscape. In this respect there is a striking difference between these and the northern hill ranges where vegetation finds a good development owing to greater rainfall. These hills like the Satmalas had a strategic importance in Maratha days when routes piercing the hills were guarded by fortified points.

From the foregoing survey it is clear that the hill ranges of the Maharashtra Plateau have certain common pattern in spite of local variations, and stand out in contrast to the cultivated lowlands below. In their economic importance they play a subsidiary role to the agricultural basins of the plateau.¹³ A major area is under grazing. It is given to

12. The city was founded in 1493 by Ahmad Nizam, and, according to Farishta, is said to have very soon become a centre of wealth and prosperity. In 1872, it was a straggling town of 37,000 persons.

13. Figures relating to the gross cropped area under Jowar and Bajri—the chief dry tract crops—show the comparative agricultural poverty of the Man Plateau, a type area in the Maharashtra Upland regions:

	Man	Khatav	Khanapur
Jowar	11-50	22-28	35-18
Bajri	66-32	48-34	29-86

Of the 350,000 sheep in the Satara District, more than half the number belong to these three Talukas.

sheep and cattle grazing. Population is thin, and is dominated by the pastoral class of the Maharashtra. It must be remembered, however, that economically unimportant though the region is now, it formed the ramparts of the Maharashtra Plateau in the Maratha history.

THE LOWLAND BASINS. The drier the region is, the more important become its hydrographical features. The whole of the plateau is a dry tract owing to its position as rain shadow area. There is a remarkably sudden decrease in the rainfall from the water parting of the Sahyadries towards the east. To quote representative stations: Khadkala has a rainfall over 65", while the city of Poona records 25". The centre of the Maharashtra Plateau is drier than its eastern extremities, because of the influence of the north-eastern monsoon in the east. Dry conditions therefore form the basal complex of the Plateau, and the residual hills underlain by less fertile soils, fully mature soils along the valleys of the streams, and, a higher water table, fix and promote human development along certain well defined directions. Economic development of the Maharashtra Plateau is accordingly confined, in the main, to three major areas drained by the Krishna, Bhima and Godavary.¹⁴

The Upper Krishna Basin

GENERAL FEATURES. This region differs from the other lowlying areas of the Plateau in two important respects. It has an almost north and south orientation, parallel to the chain of the Sahyadries, and a more pluviose climate. It forms a distinct geographical region, as it is a fairly well entrenched region lying between the main Sahyadries and the Mahadeo Hills. Taking its source waters from the Mahabaleshwar Plateau, the river flows due south and has developed a valley course extending over two hundred miles in the region of Maharashtra. A long period of erosion is in evidence. But the valley presents good regional contrasts. From Mahabaleshwar to Rahimatpur it is deep and narrow. Bordering plateaus and plateau spurs dominate the landscape to offer a contrast to the well cultivated valley tract. Crop production is influenced by the fertile alluvial soil, but there is regional variation from the upper to the lower reaches. Up to Wai, Bajri and Jowar are the main crops.¹⁵ In the neighbourhood of Satara, jowar and oilseed take their place. A sharp change in cultivation occurs further east where the river develops

14. 2D, 2E, 2F, in Fig 19.

15. Representative Crop Production, % of Gross Cropped area :

		Jowar	Bajri	Groundnut
Wai (Wet Region)	...	34	29	2
Karad (Dry Region)	...	45	11	13

an arc near the Chichnor Plateau. Jirayat cultivation now increases. Around Rahimatpur there begins a fertile stretch which is well known for its diverse crops.

Up to Rahimatpur, then, economic production is somewhat limited. But politically the region was important in Maratha days. Satara (pop 36,000) the early capital was the focus of the upper valley, although its actual site is eight miles away from the river. The site was preferred on account of the immediate protection afforded by the Ajintara fort which almost encircles the town except on its east. Beyond Ajintara the town is protected by a ring of forts. Further, it afforded easy routes through the Bhima and Krishna Valleys towards east and south. The site had already become important in the Bahamani days. Shivaji the founder



FIG. 34.—Upper Krishna Basin. (Scale 1" : 16 miles.)
Land over 2000 ft. stippled.

of the Maratha Empire seized it in 1674 and continued to administer his territories from the town. From 1699 to 1751 the town continued its career of prosperity as a seat of the Maratha Administration. But later it became a mere appendage of Poona and a scene of intrigue, when the Peshwas shifted their government to their new capital. Satara is almost a straggling town today. It has surrendered its social and economic importance to Mahabaleshwar and Panchgani, although to a small extent it remains a commercial centre on the Poona-Bangalore Trunk Road.

In its present form it finds its main support in the centralisation of District Administration.

But even today the region as whole breathes an historical air. The mellowed topography of forts and walled villages inhabited by the hardy Maratha race, are the living reminders of the former Maratha glory. Religion keeps the flame burning. Mahuli, Wai, and Parali, continue to influence the outlook of the inhabitants in a setting of fertile valleys and extensive grazing areas, the original home of the Marathas.

Beyond Rahimatpur the valley opens out to form almost a plain tract. Its southerly course brings it again in a wetter region near Karad. South of Karad the plain still further broadens out and merges in the fertile triangle of Kolhapur Karad and Miraj. This reach of the river has features of aggradation. Its course is meandering and much deposition by the tributaries takes place. When the main valley is blocked by the flood waters of Krishna, the tributary valleys get flooded extensively and for a long period. This explains the deep and rich alluvial cover that characterises the major part of this region.

AGRICULTURAL PRODUCTION. From Karad, this valley plain widens out with the junction of successive tributaries, and in the region of Valva Sangli and Kolhapur forms a plain drained by Varana, Panchganga and Dudhganga tributaries. Agricultural production is intense and diversified, both on account of adequate rainfall and rich black soil. In the central tract Jowar, Oilseeds and Tobacco are extensively grown on the pure black soils.¹⁶ Rice gains acreage along the western fringe of Kolhapur state because of the greater rainfall, and the transition from black to red soils. In the northern end of this agricultural zone, this transition from dry to wet crops is more sudden in the neighbourhood of Karad. Along the eastern border, cotton gains importance, but variability in rainfall introduces instability in agriculture in the areas of Miraj and Sangli states. Well and Budkhi irrigation has intensified production in the central region between Sangli and Kolhapur. Sugar cane and vegetable production has received good stimulus with the growth of urban centres. 'Malai' cultivation on the banks of the Krishna and Panchganga yields vegetables green fodder and meadow grass for which the Krishna valley is so famous. As interesting sidelight is the use of 'shevri' plantations on the river banks to prevent the loss of agricultural land by erosion.

Of the variety of crops in the valley, commercial crops of Tobacco and Sugarcane are of greater importance. These are closely followed by Chilies Oilseeds and Cotton. State protection to Sugar Industry in India has added

16. Agricultural Production in Kolhapur is representative of the Panchganga Basin. See Table 1.

to the prosperity of the tract, where sugarcane cultivation in particular, offers great scope. Already the Kolhapur Sugar Mills have promoted sugar cultivation under modern methods along the wet tract of the Panchganga valley.¹⁷ New mills are under construction in the Krishna valley, south of Miraj. The seasonal control of the monsoons however is beginning to be felt in the Panchganga valley, where the river course proper and the underground water show signs of exhaustion in summer, because of the extensive area that must be supported by irrigation for

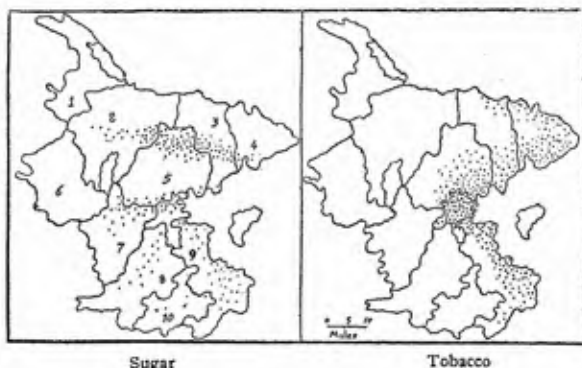


FIG. 35.— Commercial crops of the Panchganga Basin.
One dot represents 100 acres.

The distribution of these crops shows a marked preference of Sugar to the Panchganga and her tributaries, while that of Tobacco to the black soil tract in the east.

(For explanation of numbers see Table 1).

sugarcane. In spite of such local disadvantages, this region on account of its stable rainfall and rich soil, constitutes one of the richest agricultural tracts of Western India.

TOWNS. Agricultural production and commercial development of the Krishna valley have their counterpart in the prosperous urban centres. In the north, Umbraj, Karad, Islampur and Valva, are nodal points. Karad (pop. 17,000) is situated at the confluence of Krishna and Koyana. It is an ancient settlement famous on account of its religious sanctity. It is more important now as a commercial centre controlling the routes from eastern plateau regions of Sholapur and Bijapur to the Konkan lowlands through the Kumbharli pass. In the central region lies the town of

17. Nearly 2000 acres of land is worked under Panchganga irrigation by the Kolhapur Sugar Mills. Annual output is nearly 150,000 Cwts. Kolhapur Admin. Report 1939-40.

Sangli (pop. 37,000) which is situated on a slightly rising ground not far away from the river. It grew into an urban centre primarily because it was made a seat of administration by a Patwardhan chief. Railway and road construction has attracted commerce. It is somewhat puzzling to find however that Sangli flourishes in commerce in spite of the more nodal position of Kolhapur and Miraj. The reason probably lies in the fact that Sangli is better situated with reference to the surrounding agricultural region, while Kolhapur is at its western edge. Miraj (pop. 31,000) on the other hand is situated at the eastern edge, which marks the beginning of the dry tract of the Bijapur plateau. Originally Miraj found a scope in its defensible position. It became a gateway to the south for the Pehwas in their Karnatak and Mysore campaigns.¹⁸ The fort was defended by the Patwardhans, and consequently it became a seat of administration. In its modern setting, the railway junction has added to its urban character, but scarcity of water and its far off position with reference to the Krishna agricultural region have arrested its growth. Modern industry is giving stimulus to Satara and is creating new centres like Ogalewadi, Kirloskarwadi and Budhgaon.

KOLHAPUR. (Pop. 91,000). Both in its site and position Kolhapur affords several interesting aspects. The town is situated in an arc of the Sahyadry members. This defensive advantage must have been the primary cause of its being a capital of local rulers ever since the early Hindu days. The Panchganga river helped in adding an element of sanctity. Its position at the Ghat gap, where the plateau routes merge to cross the barrier brought the town its commercial importance. Ptolemy mentions it as a trade centre.¹⁹ The schism in the Maratha dynasty led to Kolhapur being made the capital of the branch of Rajaram Chatrapati after 1730. In its defensive advantage the town is similarly situated as Satara. But commerce and trade, administration and social amenities, have promoted vigorous growth. It is the leading town of Southern Maharashtra, and competes with Sangli for a commercial monopoly of the Upper Krishna basin.

18 The Miraj Fort came into prominence only after 1761 when Peshwa Madhavarao Ballal launched his famous Karnatak campaigns against Hyder Ali. Subsequently it became a stronghold of the Peshwas against Karnatak chieftains and the Kolhapur branch of the Chatrapatis. Khare's ' *Ashikant Lekha Sangrath* ' gives many interesting details regarding the strategic importance of the town.

19. Ever since the earliest times Kolhapur seems to have developed as a commercial centre, ' the city of nine roads ', protected by the Panhalla Fort. Ptolemy's Hippokura has been identified as Kolhapur. In the later Hindu period, its religious importance as ' Dakshina Kashi ' added to its strength. Even under the junior branch of the Chatrapatis the town became important only after the transference of administration from Panhalla to Kolhapur in 1730. Kolhapur Gazetteer p. 306.

THE POLITICAL MAP. The economic unity of the Krishna Basin, however has been much disturbed by the political events of the Maratha days. The present political map is its living monument. No less than eight Maratha States control the region that has an area of about 1500 sq. miles. Fortunately, political barriers have not so far disturbed economic forces. Competition between the States does exist and often leads to rivalry

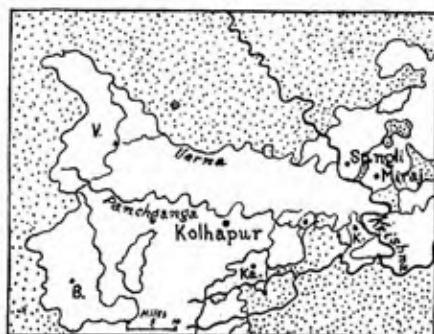


FIG. 36— Political Divisions in the Krishna-Panchganga Basin.

For details see Table 2.

British Districts: Stippled; V. Vishalgad; B. Bavda; Ka. Kagal; I. Ichalkaranji; K. Kurundwad.

in economic sphere. Jayasingpur (Kolhapur State) for instance wants to draw off the commercial importance of Sangli. Miraj and Kolhapur would like to promote trade and commerce at the expense of Sangli. From the cultural point of view, on the other hand, these political differences fundamentally influence the outlook of the inhabitants of the Krishna Basin. The growth of smaller urban centres is also due to the patronage of the State Courts and administrative centralisation.¹⁰

The Bhima Basin

PHYSICAL FEATURES. From the point of view of the drainage pattern of the Deccan Peninsula, the Bhima is a tributary to the Krishna, but within the Maharashtra Plateau, the major area is drained by this river system. From the source waters at Bhimashanker to the administrative boundary of the Province, the river has a stretch of over 500 miles. But after the first forty miles, beyond Ranjangaon, the fall in the gradient is very gradual. Basaltic formations are almost horizontal, and lateral erosion by

the streams is therefore more prominent. This largely accounts for the broad valleys of the Bhima river system. The river has a wide drainage area in the Central parts of the Maharashtra Plateau, and it forges a physiographical unity over the larger portion of the Maharashtra Plateau, through the Ghod and Sina on the north and the Mula, Nira, and Man in the south.

In spite of the physiographical unity of the basin, the regional development is much influenced by the climatic factor. There is a rapid transition from the rainy Maual to the dry areas of the basin. Rainfall rapidly declines to the east. Transitional area which is the main feature in the regional geography of Northern Karnatak is severely limited in extension. Practically the whole of the Bhima Basin is a dry area with



FIG. 37—The Bhima Basin.

1. Land over 2400 ft. 2. Land over 1500 ft.

an average rainfall varying between 19 to 28 inches. Precipitation is least in the central region, but increases eastwards under the influence of the north-east monsoons. Although the amount of rain exercises general influence on crop production, locally, soil exerts an important degree of control. Low lying valley tracts are known for their rich black soil. Reddish and grey soils prevail in the western border. In the east, in parts of Ahmadnagar and Sholapur, the upland areas have cappings of poor soil (Chunkhadi) and their junction with the low lying valleys is marked by reddish loams.

CROP PRODUCTION. Apart from the general climatic and soil control on crops, Canal Irrigation, the commercial development of Western India

and the growth of Poona, have to a great extent introduced changes in crop production during recent times. Illustrating the influence of rainfall and soils are Bajri and Jowar. Bajri is grown as a major crop in the western talukas of the Basin. In the east it is displaced by Jowar under the influence of the black soils. Along the eastern border, Jowar is raised as a rabi crop. The distribution of Cotton, Wheat and Oilseeds indicates the influence of commerce. The extent of intensive farming however can be well studied with reference to sugar cane, fruit and vegetable cultivation in the central and western parts of the Basin.

CANAL IRRIGATION. In canal irrigation, this part of the Deccan Plateau has a feature of interest. Ungraded streams with great seasonal fluctuations in water have prevented extensive canal projects on a larger scale over the major part of the Deccan Plateau, except in a few favoured spots. The Bhima Basin is probably the best developed tract of such areas. It is based on the favourable gradient of the Plateau and steadier water supply from the Sahyadries. In no small measure is it due to Government policy in mitigating the incidence of famines. Foremost of these canal projects, is the Nira Valley system with its Right and Left Bank Canals watering an area over 121,000 acres. As the canals run through a dry tract, a major portion of their waters is diverted to support subsistence crops. A comparative study of crop production of Baramati and Malsiras talukas brings out the economic importance of these canals. North of the Nira Canals, lies the Mula-Mutha system.²¹ It is a minor system, if area under irrigation is to be taken into account. Vicinity of the Poona market however has made it important from the point of vegetable and fruit gardening. The other minor constructions are the Mhaswad and Ekruk canal areas which support some crops under irrigation.

FRUIT GARDENING AND SUGAR CANE CULTIVATION.²² Since the grant of protection to the Indian Sugar Industry, extensive use is being made of irrigated area for sugar cultivation. The industry finds its localisation on modern lines in Baramati, Belwandi and Phaltan. Irrigation from local tanks, on the other hand, with the advantages of a friable soil and a long

21. Table 3.

Representative irrigated crops of the Bhima Basin. Poona District. (In acres.)

	Wheat	Jowar	Bajri	Sugarcane	Other food crops
Under all sources	24,000	63,000	31,000	14,000	44,000
Under Govt. canals	5,000	30,000	6,600	2,000	2,000

These figures give an idea of the protective nature of the Canals, and the increasing importance of Sugarcane in irrigation. Well irrigation plays a prominent part in the production of 'other food crops'.

22. Table 4.

dry period, has promoted fruit gardening in the talukas of Junnar, Khed, Haveli and Purandhar. The influence of Bombay and Poona has for the major part supported this industry. Under the patronage of the urban centres, vegetable gardening—potatoes, onions and green vegetables in particular—has made rapid progress in these talukas.

POPULATION. Population follows the general pattern as determined by the natural environment. Water courses, fertile soils and less variable rainfall, attract inhabitants to agricultural pursuits. The south-western portion of the Basin is more populous than the north-eastern. Irrigation has naturally attracted a more stable population in rural areas. In general, the Basin can be divided into two distinct economic zones, on the basis of population density and economic development. The south-western half of the basin is more populous on account of its stable agriculture intensified by irrigation. Intensive and skilful agriculture, a variety in crop production, are the leading features of the agricultural economy of the western Poona and Satara talukas. Narrow but well cultivated valleys, dotted with well built prosperous looking villages dominate the landscape of this portion of the Bhima Basin. The residual hills severely limit the cultivable area, but the deficiency is overcome by intensive production on the soil. The north-eastern half of the basin is essentially a drier tract. Irrigation is unimportant. 'Jirayat' cultivation prevails. The economic life of the farming community is bound up with the seasonal rhythm of the monsoons and its frequent failure, and this in itself offers a sharp contrast to the steady—almost all the year round—activity of the rayats in the garden area of the south-western part.

Towns. Urban development is partly due to facts of history. But since the Maratha days, commerce has increasingly influenced it. Ahmadnagar, Sholapur and Akalkot, for instance originally grew as strategic sites under the Bahamani rule. Later these developed as commercial centres. In addition, new centres appeared on the cultural landscape. Barsi, Baramati and Pandharpur, owe their origin to commercial functions, although Pandharpur claims a far wider allegiance as a religious centre. Cotton and Oilseeds trade finds an outlet from these towns. Bhimathadi livestock finds a market through the periodic fairs of Pandharpur. On the basis of population, these are moderately sized towns. In their functions however they wear an intensely business-like appearance. 'Business' alone, except in case of Pandharpur, predominates the town almost to the exclusion of other urban activities. Crowded warehouses, agency shops, cotton ginning factories and oil mills, form the business nucleus of these towns. Everything else—residential areas, schools and

social amenity centres—is tagged on to it almost as an after thought. Most of these are flourishing commercial towns, but both in their commercial function and subsistence they must march in tune with their agricultural surroundings. The rhythm of the monsoons makes itself felt even in urban centres through agricultural production. Harvesting time is a season of great activity. For the rest of the year, the town idles away the long growing season. Agricultural distress does not leave the towns unaffected. But they can bear it well because of their superior sustaining power. In this respect the western towns like Junnar stand in some contrast. Periodicity in agricultural operations is less marked, famines are rare, and intensive farming keeps the town busy all the year round. Urban handicrafts have retained their vestiges in most of these in spite of the machine competition. Cotton handloom industry persists in Sholapur, Pandharpur, Valsang, Baramati and Junnar. The new industrial policy of the Bombay Government aims at encouraging these indigenous handicrafts, and it is hoped that the traditional skill and a source of employment would be preserved by developing a special market for their products.

SHOLAPUR. Modern industrialisation finds its expression in the Bhima Basin in the two premier cities of Sholapur and Poona. Sholapur's (pop. 204,000) historical importance has very little to do with its modern growth, except that on this site supported by the waters of the Ekrukha Tank, was pegged a commercial settlement, which became connected with the economic regions outside by the south-eastern branch of the G. I. P. railway. In the Bahamani days, the town gathered its early strength around the Fort. Its strategic importance as the gateway of the Bhima and Krishna Valleys was recognised by the Marathas in their wars with the Nizam and other southern rivals. The town gained a commercial bias with the growth of the British rule. The opening of the railway in 1863 further stimulated its growth. But the development of the textile industry since the closing years of the last century has changed the face of the city beyond all recognition. It now ranks as the fifth leading city of Western India. The first settlement found its site on a small rising basaltic patch, but now the town has outgrown its original limits. Though the old town retains its distinctive features, industrial buildings have surrounded it on the west. The growth of the textile industry has created a large labour class. Slums have followed in its wake. Industry dependent on the cotton tracts of Bijapur and Gulbarga, local labour, and the finance from Bombay, has shoved other economic functions in background, and the city has therefore the distinction (!) of being the only town in Western India with a predominantly industrial bias.

POONA. The western belt of the Bhima Basin is dominated by the famous historical city of *Poona*. (pop. 300,000) If Munro's description of the modern city as "an endlessly complicated phenomenon" is to be applied to any city of the Province, it holds true of Poona.²³ It is the historical and cultural centre of Maharashtra. Brought into prominence by Balaji Baji Rao Peshwa as his capital, it was still a union of four or five villages in 1757, according to Du Perron, with a common market and some one-storeyed houses. The later conquests of the Marathas brought fresh glory to their capital. Welsh in 1801 describes it as a city with a population of six lakhs, rich, gay, and prosperous. But the fall of the Marathas seems to have brought down a very rapid decline. Hamilton in 1820 speaks of Poona as a city of 150,000 persons. Jacquemont twelve years later describes it as a dirty city with a population of fifty thousand. But since 1872, with the growth of communications and administration, the historical factor has been

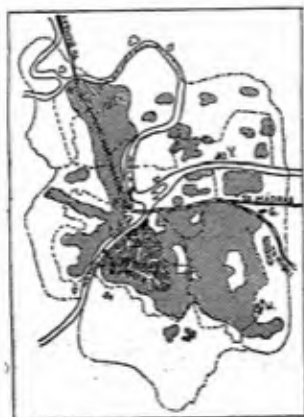


FIG. 38—Limits of "Greater" Poona.

supported by other influences, and now as the seasonal seat of the Provincial Government, as a cantonment town and a centre of trade and education, Poona is steadily growing in importance and absorbing the neighbouring settlements. Its population of ninety thousand in 1872 has risen to two lakhs and a half in 1931. Strangely enough, modern industry, the most powerful influence in urbanisation, has remained practically unimportant, and a variety of other influences has created the modern city.²⁴

23. Munro: *Encyclopaedia of Social Sciences*.

24. *Census of India 1921*, Vol. IX, p. 75

The site of *Poona* or *Punyapur* is an ancient one. Situated at the confluence of the Mula-Mutha, originally it had a beautiful natural setting. But it remained an average settlement till the time of the Peshwas. It was the charm of the surroundings and the more central position of the place in relation to the growing Maratha Empire, rather than considerations of defence, that induced Baji Rao I to make it the Maratha capital. But now due to influences, administrative and cultural in nature, Poona has outgrown the original site, and the 'Greater Poona' now absorbs the towns of Kirkee, Bhamburda, Yerrowda and the Cantonment area.²⁵ Again the old core of Kasba remains distinct as centre of trade and site of the Peshwa administrative buildings. Civil administration and cantonment have created a large middle class. Educational facilities and historical associations of the city have induced the 'Pensioners' to make Poona their permanent home. A variety of industries, fashionable shops and hotels have sprung up under the patronage of this class, and the economic base of the city today is really complex.

RAILWAY JUNCTIONS. From the foregoing account it is clear that Poona and Sholapur are the foci of human concentration. The lesser towns play a distinctly subordinate role. The commercial pattern is woven by these two cities and the smaller urban agglomerations. A feature of interest is the comparative unimportance of the railway junctions of Dhond, Kurduwadi and Hotgi, which are small settlements with a population under 10,000. The explanation seems to lie in the fact that the road system is more important than the railway in the trade of this region. Railway junctions seem to have been chosen more from the point of view of technical considerations and administrative convenience of the railways. But so far the road pattern exercises the basic influence and railways have helped in promoting inter-provincial trade only, through the larger urban centres. The Railway Junctions of the Bhima Basin accordingly have no economic support to grow. It is interesting to note that the extension of the M. S. M. Ry. line from Hotgi to Sholapur almost running parallel to the G. I. P. line offers an illustration of the insignificance of these junctions. Sometimes so great is the force of urban centres, that

25. The war has brought many changes in the cultural landscape of Poona because of its military importance. A ribbon development, for example, can be witnessed along the railway and road to Bombay. The city has flung its detachments wide enough to enclose Sinhgad and Parandhar ranges on the west and Mahadev range in the south. The new landscape however is one of 'temporary' establishments developing out of war time industrial activity. The conurbation may soon shrink to its peace time setting, but it is to be feared that the wartime activity may leave uglier trails behind it, in the form of abandoned hutments roads etc. This aspect requires the immediate attention of the town planner and the student of urban geography.

the established pattern of communications tends to be dislodged and the towns forge a nodality of communications on themselves.

The Nasik Basin

The Satmala and the Balaghat ranges give an eastward orientation to a major part of the Nasik District and the north eastern portions of Ahmadnagar. The region is drained by the Godavary System. The mountainous backbone of the Sahyadries in the Dangs throws out several transverse members to the east. Many of them are little more than spurs of the Sahyadries. But two are prominent. The Chandor-Ajanta and the Akola-Balaghat ranges rising to steep and terraced heights enclose the region to form a basin. The western and the south western borderlands of this region are furrowed by many streams and characteristically enough most of them develop broad vallays, a little east of Nasik and Sangamner. The landscape offers a warped appearance. Beyond the Dhond-Manmad railway line the undulating topography or this tract is succeeded by a true black soil plain. Further east the administrative boundary of the Nizam territory delimits the study of this region, although the geographical personality of the region has an extension up to Aurangabad and Paithan.

GENERAL FEATURES. In climatic control and land utilisation the Nasik Basin bears a resemblance to the Basin of the Bhima River though it is much narrower and flanked by greater hights. Geologically this is homogeneous region belonging to the Deccan Lavas, but the complete absence of laterite is a noteworthy feature. The distribution and regime of rainfall is also similar, but winter temperature is lower in some places in this region. Agricultural production is almost the same except in the extension of bajri and wheat for which the Basin is so well known. These occupy a major portion of the cultivated area. Bajri is grown in the western and central Talukas, and cultivation of wheat is confined to central and eastern parts. Cotton is a secondary crop and is grown only in the eastern Talukas. Fruit production is possible in the western tract where land can be irrigated by wells and tanks. The environs of the Nasik town are known for grape production. Sugar is the major commercial crop in the Kopergaon reach of the Godavary and in Pravara Valley where there is canal irrigation.

Although in land utilisation the Nasik Basin bears a general regional resemblance with the Bhima Basin, orientation and space introduce far reaching difference in the regional characteristics. The Basin develops a geographical unity further east in the tract that is now a part of the

Nizam's territories. The two hill ranges which separate this Basin from its neighbours introduce difference in land use. Largely owing to their altitude, the hill regions stand in contrast to the well tilled lowlands of the Basin. Moreover they are by themselves sufficient barriers to the movement of population. Relief therefore compels the Basin to an orientation eastwards. This natural basin however, is pierced by lines of communication in two important places: the Thal Ghat and the Manmad Pass. The region was therefore open to influence in the past from the direction of Paithan, the Manmad—Khandesh side and through the Thal Pass. Marathas attempted to bring the region into a closer political



FIG. 39 — Nasik Basin.
1. Hill Chains, 2. Canals.

orbit by developing the Ahmadnagar route and securing the strategic points. But railway construction in the British period has had a greater converging influence. The G. I. P. route from Bombay to C. I. via Nasik and Manmad has made the region an economic hinterland of Bombay. The administrative boundary on the east partially blocks the play of the economic forces. This may be therefore said to be the distinguishing feature of the Nasik Basin. It owes its importance partly to its productivity and partly to its position between the C. I. and Khandesh region, and the metropolitan city of Bombay.

SUB-REGIONS. Relief and the nature of agricultural production account for the minor regional variation within the Basin. The population of the broad western valleys depend on bajri cultivation and fruit growing. Intensive production characterises the Kadwa, Trimbak, Darna and Pravara valleys. Foremost is the valley of the Darna both from the point of

agricultural production and human activity. The Thal route to Nasik and Central India passes through the valley. Grape cultivation is a famous industry. Deolali (pop. 24,000) due to its healthy climate has developed as a health resort and a military station. Igatpuri (pop. 8000) owes its growth to railway owing to its situation at the end of the Thal Ghat. It forms a typically Anglo-Indian town like Lonavala, because of the importance of the railway. The narrow valleys at the sources of the Darna and Pravara have now been embanked to maintain a steady water supply to the Godavary and Pravara Canals. At the lower end of each valley where the land opens out to join the Godavary plain is situated a town. Of such towns, Nasik (pop. 53,000) has naturally grown, owing to its religious importance in the past, and commercial and administrative centralisation of the present.

GODAVARY-PRAVARA CANAL ZONE. East of the Nasik Region the land offers an undulating appearance. Drier crops, of which Bajri stands foremost, are grown. But canal irrigation has been almost a gift. Sugar cane production is extensive under the influence of canals. The total area under sugar cane is 22000 acres, a major part of it being in Kopergaon and Rahuri. Belapur on the Pravara canal is the major centre of sugar industry.²⁶

THE BLACK SOILS REGION. This forms a part of the extensive cotton zone of the Godavary Basin which has its continuation in the Nizam's Dominions. Agricultural production is similar to that of the black soils zones of Maharashtra and Karnatak, but there is a greater emphasis on wheat.²⁷ Irrigation plays a minor role and the region is liable to famines like similar tracts in the south. But from the point of area under cultivation and the prosperity of the farming community, this region is richer than the western tracts of the Nasik Basin. The Sheogaon-Newasa plain is well settled, and in spite of the administrative boundary which runs parallel to the river for some distance from Kopergaon to Paithan, there is economic unity between the two flanks of the Basin. The plain is dotted by large sized prosperous villages. There is however a tendency to rely too much on the commercial crops. The boom period of 1921-31 recorded a great increase in population.

26. This aspect receives a detailed reference in the chapter on Agricultural Regions.

27. Representative crop production in the Godavary Black Soil plains :— (in acres; 000 omitted) :

	Area cultd.	Wheat	Jowar	Bajri	Pulses	Oil seeds	Sugar cane	Cotton
Kopergaon :	287	47	64	83	15	13	20	2
Newasa :	326	19	11	57	13	8	3	46

TOWNS AND HANDICRAFTS. The urban settlements of the Godavary valley have many features in common. On the basis of situation, two classes of towns may be distinguished. Urban centres situated at the lower end of the tributary valleys where the valleys open out to join the Godavary Plain. Such are the settlements of Dindori, Sinnar, Chandor, Akola and Vimbhoni. Secondly, there is a string of towns along the sacred river. Nasik, Kopargaon, Newasa, Sheogaon and Paithan, belong to this category. The economic base of these urban settlements is mainly commercial. But in the past these were well known centres of silk, cotton dying, and, brass and silver ware, industries. Yeola for instance was known for its silks. Only towns like Nasik and Kopargaon which have adjusted themselves to new economic forces have now recorded a steady growth. Others are straggling urban centres.

CULTURAL RELATIONS. Within the administrative limits of the Bombay Province, the area of the Nasik Basin has obviously a limited extension as a result of the historical events. Physiographical and climatic influences, on the other hand, stretch this natural region further east into the Nizam's territory. From this point of view, the region is distinct from the other parts of the Maharashtra plateau. A common culture however binds the whole of Maharashtra which includes the Plateau, the Konkan, Khandesh, Western C. P. and Berars, and the Marathawara tract of the Hyderabad State. This larger cultural zone, the greater Maharashtra, draws its inspiration from the Godavary and Krishna Basins. A common religious tie drew the people to centres like Paithan, Nasik and Pandharpur. The teachings of the Mahanubhavas, Dnyandev, Tukaram and Ramdas emanated from the same land, and spread outwards to bind the Maharashtrians and create a common cultural tradition. Religion paved the ground for a political effort, and hence the region formed a political nucleus, from which spread the Maratha Power over the major part of India during the 17th and 18th Centuries.²⁸

In fact, the geographical setting explains, for the major part, this cultural and political development of Maharashtra. The hilly nature of the Plateau, the bare subsistence that is possible in the dry eastern valleys, and the frequency of famines, explain the hardy and virile character of the Maratha race. As agriculture had its natural limits, some other source of livelihood had to be found out. A contented outlook on life, true to lowlanders was therefore impossible. A life of activity was a necessity. The surrounding trap hills offered a good grazing area and opportunities for a roving life. These conditions led the Maratha clans into many internecine disputes, and consequentially tag

on their allegiance to the Muslim rule mercenary basis. But religion instilled a national spirit and political consciousness. The preaching of equality in religion tightened the linguistic bond, and a synthesis was brought about between the small peaceful valleys and the bare plateau uplands. During the monsoons, human life swarmed the valley settlements. The alternating hill and dale topography conferred one great advantage on the inhabitants. It gave them a variation in their physical setting without introducing a permanent contrast between the lowlanders and the highlanders. The residual hills became a training ground for the early Marathas in their warfare. In the later period these served as natural ramparts of defence against invaders. The early Maratha rule accordingly developed in this natural setting. But the lesson was based on the firm foundations of self-supporting semi-independent village community. Their conquests outside Maharashtra lacked this foundation, because the later Maratha government was organised on a feudal basis. With the loose growth of the Empire as a confederacy, the political vigour waned, and ultimately it succumbed to the growing power of the East India Company.

But nevertheless cultural trends have been preserved in a new political setting. They find an expression in the consciousness of their ancient heritage, the language, the adaptability of the people to changing environment, and the growing insistence on visualising 'a greater Maharashtra', a region that would embrace all the Maratha speaking territories of British India and the Indian States.²⁹

Khandesh

LIMITS AND PHYSICAL FEATURES. Khandesh differs in many respects from the Maharashtra Plateau regions in spite of its linguistic affinity. From the point of relief, its orientation is towards the west coast, and the focus of human activity is on the Tapti. The whole of the Khandesh tract is a topographical unit in that it belongs to the Tapti drainage, and is separated from the Central India by the Satpuras, and from the Maharashtra Plateau by the Satmala hills. On the west and the east its limits are somewhat indistinct. The eastern boundary is purely administrative, as the region has its natural continuity in the Tapti and the Purna valley, in Berars. On the west, the junction of the Tapti rift with the Gujarat Coastal tract marks the end of this region. Much of the local topography is explained by fractures which characterise the great Tapti Rift, and the subsequent erosion of the land. A remarkable feature of hydrography is the straight and entrenched bed of the Tapti river in the centre, and the

sudden change in the course of its southern tributaries from east to north. A line of fracture from Nandurbar to Pachora through Dhulia, possibly explains this uniform pattern in drainage of the southern tributaries.

A major part of the Tapti valley in Khandesh is less than a thousand feet above sea-level. The course of the river proper records a still lower level because of the deeply entrenched nature of its bed. Only in the south west, in the region bordering the Satmalas, does the land assume a plateau character. The landforms of the Tapti valley thus largely determine human geography of the region. Although in origin a rift valley between the Satpuras and the Satmala Ranges, the subsequent features of erosion in the basin have given the present day frame work of the land use and cultural pattern. The bed of the river is in many places as deep as 50 to 60 ft. from the ground level, as in the Taloda and Jalgaon regions. The erosive work of the main streams has encouraged further dessication of the region along her tributaries. This can be well seen in the Navapur tract where the railway route prefers to cross the tributary valleys rather than hugging the main valley. Beyond the immediate banks of the Tapti, erosion on the lava beds has given a landscape marked by broad lava steps. Southwards in the Satmala ranges the landscape consists of narrow valleys within the Ajanta Scarp opening out to join the main basin. Northwards, the Satpuras offer a steep face which is at places cut by the tributary valleys mostly arising out of minor fractures in the mountain crust.

All these features of physical landscape are reflected in the human geography of the Khandesh Basin. The richest half is not the immediate banks of the Tapti, but the intermediate plain,—in the danger of suffering rapid erosion,—developed on the famous Black Cotton Soil. Quite contrary to the general pattern of rivers, the Tapti discourages population concentration on its banks. Erosion and the consequent 'bad lands,' topography prevent irrigation and intensive cultivation. Here villages are small settlements. But it is along the central black soil belt that the population, large villages and towns which are route centres, mark the cultural landscape. These are well connected by roads and railways. Similarly the southern valleys of the Satmala ranges are well irrigated tracts of denser settlements, marked by a nodal centre like Jamner or Parola situated almost at the junction of the valleys and the main basin.

The influence of relief seems to be more indirect and general. The lowlying Khandesh tract owes its agricultural importance to the Black soil developed on the trap outflows. Alluvium supercedes it in the lower course of the river. But a variation is introduced along the borders of the Khandesh region and in the intervening upland stretches in the Tapti valley. Fertile land, in general, falls into three parallel strips running along the course of the river. The Malegaon Plateau stands aloof by itself.

It is drained by the Girna river, and separated from the main basin by a stretch of upland region.

Climatically, there is some contrast between the western and eastern parts of Khandesh. The administrative boundary between the West and East of Khandesh districts almost coincides with the climatic division. Western Khandesh is rainy and unhealthy except in the Malegaon Region, which is a rain shadow. In the east, rainfall in summer declines and records a slight rise in winter. There is a consequent change in vegetation and agricultural types. This climatic difference persists in almost every aspect of regional geography and lends a suitable basis for regional classification.

THE TAPTI VALLEY EAST. This tract is easily the richest and the best developed region of the Khandesh.³⁰ On its east, except for the Gawilgarh range, the administrative boundary constitutes its limit. Along the central zone lies the black soil plain of the Tapi bordered on the north by the Satpuras and on its south by the Parola-Erandol hills. This rich tract is the famous cotton zone of Khandesh. The immediate banks of the Tapi are comparatively unimportant. Agricultural Production has 'Jirayat' character. Crops of the medium rainfall zone, like millets, oilseeds and pulses are produced. But cotton dominates the agricultural economy.³¹

SETTLEMENTS: RURAL AND URBAN. Cotton cultivation therefore explains the economic prosperity of the region. It is also the basis of the high urban development. The walled, large, but compact, villages that are situated in this region reflect the agricultural prosperity of the community. These in their site and pattern as well as in the nature of the building material bear a close resemblance to those of the Eastern Karnatak. The site of the villages is governed by the extremely eroded banks of the Tapi and her tributaries. Most of these are situated well away from the river and chose a fairly plain tract above the monsoonal

30. Fig 3A. Tapi Valley East, East 3B. Malegaon Plateau, 3C. Tapi Valley West, 3D. Satpura Highlands.

31. Representative Crop Production in the Eastern Valley.

		Jowar	Wheat	Bajri	Pulses	Oil seeds	Cotton
Raver	...	30	8	2	19	19	42
Amalner	...	24	11	21	14	37	59
Jamner	...	53	0	9	58	51	47

Representative Crop Production in the Western Khandesh.

		Jowar	Wheat	Bajri	Pulses	Oil seeds	Cotton
Dhulia	...	95	4	88	21	43	94
Nawapur*	...	7	0	0	27	7	25
Shahada	...	47	41	5	14	20	50

* Rice : 30.

flood levels. Their walled structure is indicative of the much disturbed past of the Khandesh tract. But the towns of Khandesh offer a still stronger evidence than the villages, of its economic well being. In no other part of the Province, has urbanisation gathered such a momentum in recent days.³² There are no less than twentyfour urban centres in an area of 250 sq. miles. More interesting it is to note that this urban growth is of a very recent origin. It is largely explained by the commercial prosperity of Khandesh since the advent of the British rule. Not long ago, towns like Bhusaval, Amalner and Dhulia, were straggling settlements. During the 17th and 18th centuries they were the scenes of raids and plunder when the rival powers contested for supremacy over the land. An

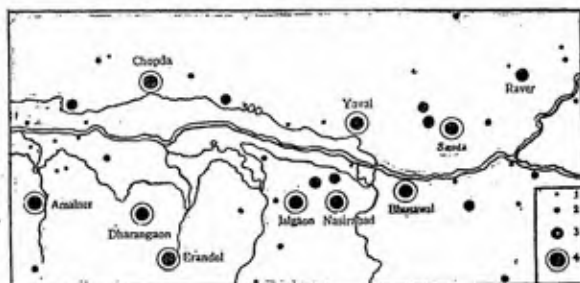


FIG. 39.—Towns and villages of East Khandesh,
1. Below 2500, 2. 2500-5000 3. 5000-10000 4. over 10000.

era of commercial prosperity was ushered in, with the settlement of this region under the British Rule, the construction of roads and railways, and extension of cotton cultivation during the last century. The towns derived a new stimulus. Many rural settlements like Bhusaval finding a new economic setting grew into urban centres. Dhulia (pop 53,000) and Jalgaon (pop. 42,000) are the major towns owing to administrative centralisation. Others like Amalner are commercial centres and but are also taluka headquarters in most cases. A new force has entered in their history. The expansion of the cotton textile industry has given a sudden stimulus to most of these centres. Commerce first, and then industrialisation, explain the rapid growth of these urban centres during the last forty years.³³

An interesting sidelight on the prosperity of the East Khandesh tract is the importance of the transit trade. Formerly the Tapti valley was the

32. Table 6.

33. The Khandesh Cotton Industry receives a detailed reference in the Chapter on the Industries.

natural outlet for the rich products of the Central India and Berars tract. For the major part, trade followed this route to the Gujarat and Konkan Coast during the Moghal and Maratha period. But the route lost its economic advantage with the rise of the Bombay port and the construction of the G. I. P. route to Central India and the North. Although the relative importance of these routes has changed in modern times, the Khandesh region as a whole, has lost little. The trade between the north-eastern hinterland and India's premier port is controlled, in Khandesh, through the Manmad Gap and the upper Tapti and Purna valleys. This largely accounts for the growth of 'railway' towns like Jalgaon and Bhusaval. The region accordingly occupies an important midway position between two regions of high agricultural and commercial development: the Central and Northern India, and the West Coast of the Bombay Province.

The Malegaon Plateau

To the south-west of the Eastern Khandesh Tract, there is a change in relief and agricultural production. The land gains a greater elevation, and is enclosed by the Galna and Satmala Hills to form a broad basin. Its natural outlet is the Girna Valley which drains the land to the main basin. The trap soil bears a resemblance to the rest of the Khandesh tract, but rich soil is limited to the valley of the Girna and her main tributaries. Well wooded and tilled valleys therefore stand in contrast to the poor grass topped upland areas which enclose them. Bajri gains a greater importance. But other crops also find good scope. Girna Irrigation has further added to the productivity of the region. But in agricultural yield and population the tract does not compare favourably with its parent region the East Khandesh. The centre of human interest is naturally Malegaon (pop. :8,000). It is almost a geographical focus. Situated on the banks of the Mosam river (2 miles away from the Girna), its economic base today is administration and commerce, but in history it commanded a high strategic value, as a defensible point guarding the highway between the Central India and the Deccan. But its present far off position from the G. I. P. arterial route, has made it a minor settlement mainly dependent on local commerce and the textile handicrafts for which the town was well known in history.³⁴

THE TAPTI VALLEY WEST. In the Vajpur-Sindkhed tract the Tapti Valley offers a sharp contrast to its upper course. The river bed is entrenched to a still greater extent. Erosional features acquire a greater

importance in this region owing to a fairly heavy rainfall. There is also a greater economic isolation. Agricultural production is limited only to the immediate flanks of the river. Forests and unhealthy climate restrict human development. Rice and Ragi displace the dry crops of the Eastern region. Dairying has become famous in certain localities owing to good fodder supply. But the region as a whole is thinly populated. In spite of the Tapti Valley Railway, it has gained little commercial importance. The trade of Gujarat is tapped by Bombay through the B. B. C. I. routes, and that of the Central India and Berars, passes the G. I. P. route. In between these routes there is little economic justification for the Tapti Valley route, except from the point of view of local trade, in rice, wheat and timber.

THE SATPURAS. For the major part, the Satpuras act as a natural barrier between Khandesh and the Central India. The general features of relief bear a resemblance to those of the other residual hills of the Deccan Plateau, except in two respects. The Satpuras have a greater average height, and secondly, their fractured southern edge gives them a formidable appearance from the Tapti side. The varying heights of the chain are marked by a series of plateau steps, of which the Turan Mal records highest level. These are, at places, separated by minor rift valleys like that of the Aner river. Bare tops and well wooded valley sides are two typical features of landscape. Often there is also a vegetational contrast between the western and eastern parts of the Satpuras. The western portion is covered by typical monsoonal forests. The eastern mountainous tract, on the other hand, is characterised by grasslands and scrubs. The transition, however, is gradual. From the human point of view, the Satpuras are of great interest on account of their primitive inhabitants, the Bhils, who offer a very fruitful field for research to the student of cultural Geography.³⁵

SPACE RELATIONS. It is usual to include Khandesh in the Greater Maharashtra, but geography does not so wholeheartedly support the claim. There are many distinguishing features between the Maharashtra Plateau and Khandesh in relief and human activities. In relief and orientation, Khandesh looks more towards the West Coast. A fertile alluvial and lava soil supports a dense agricultural population, which thrives on commercial crops. Similarly, the region differs from the Maharashtra Plateau in the influence exerted by local relief forms and its position between the Central India and West Coast territory.

There is a contrast between the lowland region of the Tapti valley and its upland outskirts. The lowland area exhibits all the characteristics

35 Simcox : The Bhils of Khandesh.

of a peaceful agricultural community. Modern textile industry has strengthened this aspect. But the mountain ramparts on both sides, and the isolated upland tracts of the valley, have always been a theatre of wars and campaigns in the past. This difference between the lowland and highland life is seen in its extreme form in the Satpuras. As has been already seen, relief in the Maharashtra Plateau is well marked as to allow a variation in the occupation of its inhabitants; but the difference in the residual hills and the lowland valleys is not so fundamental as to introduce a permanent rift between the lowlanders and highlanders. In Khandesh however the height and the extent of the Satpuras have achieved this result. Like the Scottish Highlanders in British History, the Bhils of Khandesh have played a role much disturbing to the settled population of the region. Till the extension of the British rule, Khandesh never found political unity or peace except for short durations.

If relief was not favourable to the political unity of the region, its position in relation to its neighbours made conditions worse. In history, Khandesh has played the part of a 'buffer' territory. Earlier influence came from the south under the Chalukyan Kings. In the later period of Hindu India, the Gurjar Kings extended their rule through the lower Tapi valley. Subsequently, Rajput and Maratha Chieftains secured a hold on many strategic points. Then came the Muslim invasion from the north when Khandesh became a 'political highway' for the northern invaders marching towards the south. During this period, Khandesh had a unified rule under the chiefs who had made Malegaon their capital. In the struggle between the Marathas and the Moguls the region became an active theatre of campaigns. The situation continued in the days of the East India Company. Thus at the beginnings of the British rule, Khandesh was a poverty stricken and backward tract.

Historical events however have left their impress in the shape of racial and linguistic differences, although modern commercial and industrial development is fast effacing them. The Eastern Khandesh and the Malegaon Plateau are eminently Maharashtrian in their culture and leanings. But the substratum of the society has an influence of the Gurjar and Bhil culture. Towards the west and the north this influence increases. The Khandesh agriculturist has a cultural affinity with Gujarat. In eastern parts however cultural traits are transitional. Happily, modern commercial and industrial development has relieved the region of its poverty, but culturally it remains a comparatively backward zone on account of its much disturbed past.

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TABLE I

Marathi speaking Population in different Provinces.

Bombay	...	9,500,000
Bombay States	...	1,800,000
C. P. & Berars	...	5,400,000
C. I. States & Agencies	...	230,000
Gwalior	...	22,000
Baroda	...	35,000
Nizam's Dominions	...	3,785,000
Mysore	...	100,000
Madras	...	330,000

TABLE II

Comparative statement of Area and Population of the States of the Krishna-Panchganga Basin.

	Area (in sq. miles)	Population
(i) Kolhapur	... 3219	1,092,000
(ii) Feudatory States :		
Bavda	... 243	51,000
Vishalgad	... 235	33,000
Kagal	... 115	49,000
Ichalkaranji	... 241	68,000
(iii) Sangli	... 1146	293,000
(iv) Miraj (Sr. & Jr.)	... 562	154,000
(v) Kurundwad	... 326	99,000
(Sr. & Jr.)		

TABLE III

*Major canal systems of the Maharashtra Plateau.
Irrigated Area in Acres.*

	Kharif	Rabi	Total
Bhima Basin :			
Nira Right Bank	... 23,000	48,000	71,000
Nira Left Bank	... 20,000	28,000	48,000
Mutha Canals	... 11,000	2,000	13,000
Godavary Basin :			
Godavary Right Bank	... 9,000	12,000	21,000
Godavary Left Bank	... 8,000	9,000	17,000
Girna Basin :			
Girna Canal	... 4,000	5,000	9,000
Pravara Right Bank	... 6,000	8,000	14,000
Pravara Left Bank	... 22,000	27,000	49,000

TABLE IV
Representative Crop Production in the Bhima Basin.

	Cereals	Pulses	Oil seeds	Sugar	Cotton	Vegetables and Fruits	Total Cropped area
Poona (Urban)	...	5,000	300	154	300	...	1,000
Haveli (Suburban)	...	153,000	14,000	7,000	2,000	...	7,000
Junnar (transitional)	...	239,000	35,000	7,000	900	...	7,000
Khed (transitional)	...	196,000	24,000	20,000	233	...	11,000
Bhimathadi (dry)	...	193,000	13,000	15,000	6,000	3,000	235,000
Indapur (dry)	...	193,000	14,000	24,000	5,000	6,000	250,000

This brings out the influence of Poona city on the vegetable and fruit production, of the canal irrigation on sugar production, and the importance of vegetable gardening and pulses in the transitional zone.

TABLE V

Greater Poona (1931).

	Area in acres	Population	Density per acre
City Municipality ...	4,083	162,901	39.90
Suburban Municipality..	3,206	16,676	5.20
Poona Cantonment ..	2,933	35,807	12.21
Kirkee Cantonment ...	3,399	16,302	4.79
Suburbs ...	11,800	18,501	1.59
GREATER POONA ...	25,423	250,187	9.84

TABLE VI

Growth of the Khandesh Towns.

The following figures show the contrast: the slow growth of the 'Old' towns, and the rapid-growth of the 'New', because of the industrial influences.

	1881	1921	1931	1941
Dhulia ...	18,449	30,800	39,939	53,308
Jalgaon ...	9,918	17,867	34,375	48,596
Bhusaval ...	9,613	18,312	27,985	36,352
Amalner ...	7,627	13,232	23,491	34,694
Dharangaon ...	13,081	15,607	18,542	19,840
Chalisgaon ...	*	9,453	16,808	22,123
Chopda ...	13,932	17,008	18,434	21,544
Parola ...	12,352	14,177	12,277	15,247
Yawal ...	8,889	9,147	12,751	13,705
Nasirabad ...	10,243	13,033	14,753	14,392
Nandurbar ...	6,841	91,839	16,919	22,139
Erandol ...	11,501	13,144	12,382	15,098

* Figure not available.

CHAPTER VIII

North Konkan and Bombay

Of the littoral regions of Western India none is more varied in relief, and interesting in history, than Konkan, the coastal tract backed by the Sahyadries and extending over a stretch of 320 miles and having a population of nearly six millions. Although the origin of the word 'Konkan' is obscure, tradition delimits this coastal strip to the Damanganga river in north and the Terekhol in south.¹

GENERAL FEATURES. Relief is easily the dominating factor. The geological matrix is that of the Deccan Trap. The primary physiographical features are associated with the Trap and the earth movement previous to its formation. This explains the form of the rising terraces of the Sahyadry flank and the narrow plain of subsequent marine denudation drained by a system of parallel flowing streams. Local topography however is governed by the subsequent formations. Laterite predominates in the south. Estuarine deposits have extended the coastal flat lands. From the seaward side, differential marine erosion has introduced variation in the shape of bays and headlands, although in many places the coastline offers the appearance of a normal mature type. Monsoonal rhythm in climate evidently guides all human activity. Apart from the swampy growth on the coastal areas, the scrub on the laterite, and the Monsoonal forests on the foothills of the Sahyadries, rice dominates the cultural zone. The periodicity of the south-western monsoons, unrelieved by the north-eastern or the thunder showers of the ante-monsoon period, rigidly controls the agricultural rhythm of the population. The Sahyadries have given a western orientation to the Konkan Coastlands, but man through a long history of settlement, has found it convenient to pierce the barrier through the Ghat passes in order to establish contact with the plateau beyond.

HISTORY AND ECONOMIC DEVELOPMENT. The general features of relief, climate and vegetation, are common all over the Konkan area. But human development introduces regional variations. Historically, Konkan

1. The antiquity of the region may be gleaned through the frequent mention of 'Konkan' or 'Aparant', in the Puranic and Early Hindu Literature; Ptolemy mentions the flourishing ports of Sopara and Cheul. Mah. Dnyankosh, pt. II., p. 704.

was always a zone of contact between India and the West.² In the early Hindu Period, the land was dominated by local rulers of the Maurya and Kadamba Dynasties, although at times they acknowledged the suzerainty of powerful emperors like Ashok. The trade of the Konkan coast with Europe finds mention in the earliest phases of the Greek and the Roman civilisation. During this period, Sopara, Thana, Kalyan were known as the gateways of India to the traveller. In the later Hindu period, and throughout the days of Muslim power in India, increasing contact with Arabia and the Persian Gulf began to be established through these ports.³ Every subsequent stage in oceanic navigation marked a corresponding growth in the importance of Konkan on account of its maritime position, and the real contest therefore began with the arrival of Western Powers on the Indian scene. In the rivalry of the Western Nations for supremacy in India, the English were successful. They consolidated their success by overthrowing the Maratha Power. It is significant to note in this connection that in Bengal and Madras, the English supremacy could be easily established within twenty years after the battle of Plassey, but they had to struggle hard to maintain and strengthen their foothold in Konkan. Relief and the rise of Maratha Power in Western India were the two great handicaps.

The human geography of Konkan therefore not only exhibits natural influences wrought by relief and monsoonal rhythm, but offers direct evidence of its historical past in the shape of ancient Buddhistic Caves, Hindu temples, Muslim and Christian population, and the commercial prosperity of certain towns. The political map serves as a reminder of its recent past. There are the states of Jawhar and Janjira, the vassals of the Mogul Empire, Sawantwadi which was a part of the Maratha dominions, and, Diu, Daman and Goa, the remnants of the Portuguese Empire. Growth of the British connection has materially influenced the Konkan Coast mainly through economic forces. Before the British rule, population depended on agriculture and fisheries. The steady commercial and industrial development of Bombay created a far greater economic allegiance to that Port than towards the immediate hinterland of the Coastal strip. It largely accounts for the almost revolutionary changes introduced in the character of population and the cultural landscape of the region. On the basis of relief and economic development, therefore, Konkan can be usefully classified into: (i) North Konkan, (ii) The Bombay Metropolitan Region and the Ulhas Basin, and (iii) South Konkan.

2. Thana Gazetteer, pt. II, p. 414.

3. Arab Geographers of this period describe Bassein, Bombay, Dabhol, Chaul, Panvel; Kalyan and Bhivandi as the prosperous ports during the Muslim Period. Bassein Bombay and Revadanda rose to eminence during the Portuguese rule. Thana Gaz., p. 444.

North Konkan

North Konkan has one special feature in relief. Unlike the rest of the region, it has a long flat alluvial strip of land along the coast line, separated from the interior by the longitudinal hill ranges of Kaldurg. East of these hills, lies the Vaitarna Valley. The drainage is peculiar in that the streams have sharp bends. The valleys are bordered by resistant

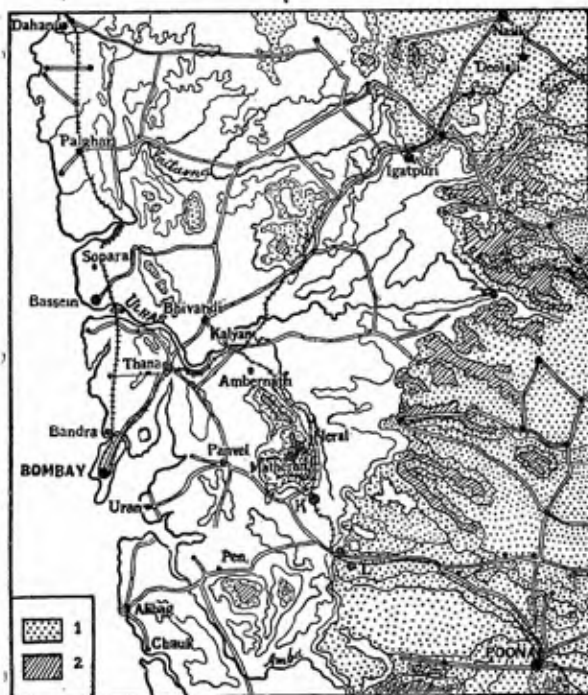


FIG. 40.—Bombay and the Ulhas Basin.
1. Land over 1000 feet. 2. Land over 2000 feet.

bosses of Trap. The major human interest naturally centres round the coast line because of its agricultural productivity and commercial development. Rice dominates the agricultural economy and occupies as much as 54% of the cultivated area. Its production on the alluvial flats is augmented by coconut on the sandy stretches, and betelnut and plaintain

cultivation on the sticky black soil patches.⁴ A feature of interest in the human geography of the land is the dense population distributed in well marked rural and semi-urban settlements. A part of the population draws its sustenance through fisheries and commerce. A great change has taken place in the relative importance of the towns. Agashi, Tarapur and Umbargaon, trade centres of antiquity, are now straggling hamlets. Dahanu is an administrative centre. Mahim and Palghar are market towns. In the south lies the famous Portuguese port of Bassein. (pop. 14,000) situated at the mouth of the Ulhas. Its rise as a commerical centre is of a comparatively recent period. Under the early Hindu Kings, the



FIG. 41.—Site of Basin.

Squares : Garden Lands. Shaded : Swampy areas.

trade passed through the Ulhas creek to Kalyan.⁵ That attracted the Portuguese in 1526. The site was politically occupied by them in 1533. Bassein then developed a growing trade in rice and timber. Fortifications in these times did much to attract Commerce and Population. By the 17th century, the port had become famous for its ship building. It maintained its growth for a century in spite of the Maratha raids. In the early years of the 18th century, it had a population of 60,000, but later, it surrendered to the Marathas in 1739, largely due to the internal decay of the Portuguese administration.⁶ With the decline of the Portuguese, the settlement lapsed into obscurity, and now it is only a minor township of local administrative and commercial importance. Its stagnant nature,

4. Representative Crop Production : (in acres, 000 omitted).

	Rice	Pulses	Vegetables etc.	Grass	Total cropped area
Dahanu ...	47	5	...	35	83
Bassein ...	34	1	4	4	43

Bassein shows the influence of Bombay, and Dahanu that of the milk industry.

5. Thana Gaz., p. 420.

6. Sardesai : Marathi Riyasat, pt. II. p. 321.

however, can well be gleaned through its population which has ceased to grow even during the recent decades. This decline is further reflected in the social landscape. Ruined churches, and the poor economic condition of the Christian population that is still a dominant part of the town, offer a sharp contrast to the surrounding regions, and remain as vestiges of the Portuguese Catholic splendour.

Inland, along the valleys of the Vaitarna Basin, human interest follows paths of rice cultivation. Population is dense but rural. Hamlets are small and are dotted along the streams. The flat topped hills that separate these streams are covered with forests, with occasional grassland patches where 'dahli' cultivation of crops like Nachni takes place. Sugar cane cultivation finds a good scope in the valleys where irrigation is possible. It has a special localisation in the Tansa Valley. Nearer the Metropolitan area, vegetable gardening displaces, wherever possible, all other crops, under the stress of the urban economic influence. The eastern boundary of the Vaitarna Basin is marked by the sub-Sahyadrian plateaus and the Sahyadry terraces which merge on their crestline into the lofty Tryambak hills.

The Bombay Metropolitan Region.

South of the Ulhas river there comes a sudden change in the landscape owing to the expansion of the Metropolitan city of Bombay and its satellite towns. Growth of Bombay as a leading port of the country has made all this regional difference. Its rise is of a recent date as compared to the other coastal towns of India. It is well known that the advantage of a natural and well sheltered harbour has been the primary factor. But certain other aspects regarding its site and position must also be noted. The site is due to the geological history and the structure of the string of seven islands on which stands the modern city, and of the Salsette Island which acts as a useful appendage to the 'main core'.

POSITION. No less important, although this factor is sometimes not sufficiently stressed, is the position of Bombay in relation to the mainland. This part of the Konkan is favourably situated in relation to the rich hinterland of Gujarat and the Maharashtra Plateau. The coast route brings Gujarat within an easy reach of the region. The Ghat routes via the Thal, Nana and Bhore passes have brought the plateau hinterland into economic touch with the region. This convergence of routes across the Sahyadry barrier and along the North Konkan, gave the Ulhas Basin its early commercial lead. Urban history of Bassein, Chaul, Kalyan, and Bombay, records this importance of position. In a more vigorous form,

does it remain effective in case of Bombay, due to modern developments in land and sea routes.

It is interesting to enquire at this stage why Bombay remained an obscure fishing settlement till the 17th C. when other ports like Thana and Kalyan with less natural advantage came into the limelight as early as in the Hindu Period. The reason lies in the development and progress in oceanic navigation. The early ports of Western India, as indicated elsewhere in this survey, are situated on narrow and shallow creeks. Protection from the monsoonal conditions was sought by selecting a site behind a sand bar or far back in the estuarine waters. Such site did well with the early shipping of small dimensions. With the growth of oceanic navigation, many of them, like Surat with its Suvally Roads, were improvised to accommodate larger ships, but most of them fell into disuse, because of the natural limitations of site. By such natural process of selection, throughout the centuries, Bombay was discovered in the 17th C. when the sailor was ready to handle ships of larger dimensions, drawing a deeper draught and requiring greater anchorage and berthing facilities. With a spacious harbour that covers an area of 120 sq. miles of sea surface, and a depth over five fathoms in the main road, Bombay fulfills all the needs of modern navigation. It is not without significance that, at what happened to be the close of Portuguese supremacy in India, Antonio de Mello de Caastro, Viceroy of Goa, wrote to the King of Portugal in 1662, "the best port Your Majesty possesses in India with which that of Lisbon is not to be compared".⁷ As early as in 1634 the Portuguese realised the potentialities of Bombay. Fortification followed. It was with a genuine reluctance that the local authorities surrendered the island to the English in 1662.

GEOLOGICAL HISTORY. Although most of the natural landscape of the Island has now been superimposed with buildings and other human artifacts, relief is characterised by two longitudinal hill chains underlain by lacustrine deposits and lava, and an intermediate plain — The Flats — of recent deposits of clay and sand. The land owes a common origin with the Deccan Peninsula, to the great volcanic outburst of the Tertiary Era.⁸ Its separation from the main land was probably due to a fault occurring at the close of the Deccan Trap volcanic activity. While the Deccan Trap flows thus formed the basal complex of the Island, variations in relief have

7. Danvers : The Portuguese in India, Vol. II, p 337.

8. Geologists recognise four periods in the formation of the Island : (1) The volcanic activity which produced the Deccan Lavas. (2) The Period of quiescence during which the freshwater strata were deposited. (3) The Period of secondary effusions. (4) The recent period of the deposition of Estuarine-clay and Marine-sand. Kalapesi : Geological History of the Bombay Island. Journal of the Gujarat Research Society. Vol. VIII.

been introduced by the subsequent geological events. A period of quiescence produced the fresh water formations of the Inter-trappean type. This was followed by a major volcanic effusion which possibly covered the fresh water and the earlier formations, in one continuous horizontal flow, and which now caps the main ridges of the Island. Although a large portion of the Island was hence forward free from major disturbances, the subsequent secondary and 'local' effusions gave the earlier horizontal flows, a westward tilt, and, produced the present longitudinal ridges of



FIG. 42.—Geology of Bombay.

Lines : Lacustrine deposits and lava ; Unshaded : Clay ; Stippled : Beach Sand.

the Western and the Eastern margins, and the plain and hill chains of Volcanic Breccia of the north-eastern parts of the Island. In the period that followed the close of all the volcanic activity, the region must have presented an appearance of a series of islands separated by the shallow seas. The subsequent period of quiescence was accompanied by deposition of estuarine-clay and marine-sand, the consequent filling up of the shallow arms of the sea, and the development of the intermediate belt of plain in the island, underlain by Blue clay, Littoral concrete, and the upper alluvium, developing out of later upheavals and subsidence of the land.

RISE OF BOMBAY. There is little doubt that Bombay remained an obscure fishing settlement till the arrival of the Portuguese. Buon Bahia or 'the good bay' is a tempting but hardly acceptable interpretation

which claims a Portuguese origin. Yule traces it to Mumba Devi. Down to the 13th century however the settlement consisted of several islands with a fishing population. It seems to have attracted little attention of the political rivals on the mainland. Hindu influence seems to have percolated to some extent in the times of the Shilaharas, when Mahim on the mainland, was a port famous as Mahikavati.⁹ After a brief but stern spell of the Muslim rule, these islands passed under the influence of the Portuguese, who after fortification, gave them their first shape in their modern evolution. Transfer of Bombay to the English in 1664 came as a complete surprise to the local authorities. But strangely enough its potentialities were not realised and it was seriously suggested in 1668, that the factory should be removed from its new site to Janjira.¹⁰

In the early stages, the English had to contend with two powerful rivals, the Portuguese and the Marathas. But the 18th century witnessed a steady growth of the Port under ambitious governors like Aungier and Child. The decline of the Portuguese on the West Coast after the siege of Bassein in 1739, relieved the Company of its major European rival. The Marathas were skillfully managed by the Company's representatives at Bombay till the war of 1770's leading in the end to the Treaty of Salbai. The Treaty of Bassein (1803) gave the Company a firm foothold on the mainland, as it gave the English, Salsette and the neighbouring territory, which was so vital to the protection of Bombay. The fear of losing the precious possession ceased from that time. Various accounts of the travellers have given us an idea of the progress of the town during the 17th and 18th century. In Fryer's time (1672) much of the swampy land was reclaimed. The islands were thus connected to form the modern site of the city. By 1772 it had a population of 70,000. Forbes in 1779 insists that the settlement should be called a metropolis. During the 18th century, Bombay had an unprecedented growth in volume of trade and population. In particular, the American Civil War, through the Cotton Mill Industry, gave a sudden spurt to its expansion. Since then, the prosperity of the city has continued in the present century in spite of several handicaps.

URBAN GEOGRAPHY. The present day metropolitan city, with its population of 15 millions, exhibits all the vigour of the past, and within its urban limits shows an interesting variety in detail. The 'Old core' of the Fort as is the characteristic feature of every urban settlement, remains distinct as its nucleus.¹¹ Within the Fort area lie old buildings of the Company days carrying an antique appearance in spite of the more modern

9. Keshavacharya : Mahikavathichi Bakhar (Rajwade).

10. Grant Duff : History of the Marathas, Vol. I. p. 174, (Edward's Edn.).

11. Vidal de la Blache : Principles of Human Geography. p. 476.

superstructures. The old Bazar is now the 'City', the financial centre of the modern agglomeration. On the outskirts, the Fort has lost its distinctiveness and has merged into the later extensions. South of it, is the Kolaba extension, now a military zone owing to its strategic position. Growth of the city has created high land values, and thus there has been an expansion to the west as well. In the earlier period of the Company's

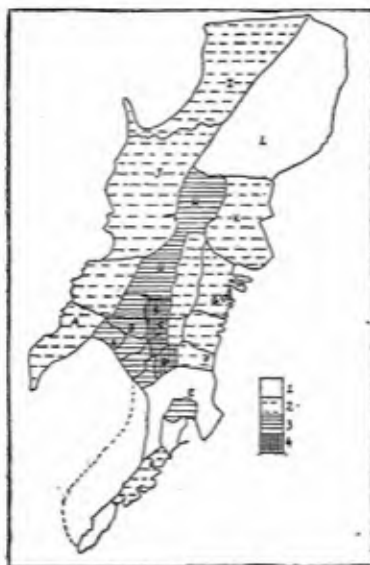


FIG. 43.—Social Zones of Bombay and density of population.

A. Walkeshwar, Choupati, Girgaum—residential areas. B. Khetwadi and Tardeo. C. Bhuleshwar-Kamatipura dwelling area. D. Kalbadevi and Crawford Market. E. Esplanade, Fort, and Apollo—Administrative and Financial Zone. F. Mandvi—bulk storage waterfront. G. Mazgaon Docks. H. Parel-Byculla Industrial Belt. I & L. Dadar-Matunga-Mahim suburban 'colonies', and Sion. J. Worli. K. Sewri.

Density per acre: 1. Below 30; 2. 31-100; 3. 101-400; 4. 401-727.

history, this led to the development of social and educational institutions in this western zone, now known as the Esplanade and Flora Fountain areas. 'The Backbay Reclamation' scheme of the 1920's was further undertaken to satisfy the demand for more space in this western strip of the island.

North of the city, lies the 'Indian' town extending over Kalbadevi and Girgaum, crowded and sandwiched between two zones of great social

contrast. Along the eastern waterfront of the island are docks and storehouses supported by a network of railway sidings around Wadi Bundar. From south to north, along the eastern shore, land seems to have been put to a gradually inferior use in commerce and transport. Just outside the Fort there are the naval and the passenger docks. These are succeeded by the Alexandra and Prince's Docks. Further north, are situated the repairs 'shops' of the shipping industry and oil delivery piers and storage areas. Along the salt flats of Wadala, between the island and Trombay, coasting trade with Konkan finds a scope, while the deeper area of the Thana creek, enclosed by the Bombay Island, Salsette, and the mainland, affords a sheltered anchorage to the ocean going vessels. The whole of the eastern shoreline therefore in spite of its variety in economic functions constitutes the "business" zone of the metropolis where life runs on a clockwork and "bulk handling" basis."

But the western shoreline offers great cultural contrast. Owing to its open position to the Arabian sea, it is clearly unsuitable for harbour development. A western breeze and an open situation on the other hand have attracted the richer sections of the urban community. Rich and well spaced structures of Churchgate, Choupati and Walkeshwar, stand in marked contrast to the middle class dwelling areas situated just to the east of them. This is the home of the financiers, industrialists and administrative officers, seeking residence within or in the neighbourhood of the Fort. With the steady growth of the city, urbanisation has further moved north in the island. The mill industry found a suitable point of localisation in Parel, and under the aegis of this industrial development, a large working class resides in the slums, which separate the Girgaum and Grant Road Section from the Mill area proper. A striking social contrast is afforded here between the Kamatipura slums with their monotonous pattern of houses. and the middle class areas on their either side.

SUBURBAN DEVELOPMENT. As is natural for a growing city, suburban development has gathered pace during the present century. North of the Mill area, are the middle class dwelling zones of Dadar Matunga and Mahim developed during the last three decades. Town planning on cooperative basis has given these areas a much neater appearance than the irregular and crowded landscape of Kalbadevi and Girgaum. A communal grouping of residential quarters is also much in evidence. The Hindu and the Parsi 'colonies' of this zone mark the end of the Bombay Island proper. But suburban movement has extended beyond the Mahim Creek under the pressure of growing population, and is vigorously supported by the electric passenger transport of the G. I. P. and B. B. C. I.

lines. Here again the Western Coast seems to have gained a greater social esteem. Along the B. B. C. I. route stand a string of suburban settlements up to the Bassein Creek. Electrification of railways has still further extended the urban influence upto a distance of forty miles from the Central Terminus. On the east coast facing the mainland, the G. I. P. route marks a line of suburban towns like Kurla and Ghatkoper, up to Thana, but the urban influence has now almost reached as far as Kalyan.¹⁴ The growth of these suburbs is not so vigorous as those of the west coast, possibly because the west coast enjoys a better aspect and a better climate. The west coast suburban development is largely marked by urban dwellings, while the towns of the east coast are now centres of ancillary industries of the metropolis, like the cement, pharmaceutical and engineering.

THE SALSETTE ISLAND. In a way the whole of the Salsette Island may be described as an economic and social appendage of Bombay.

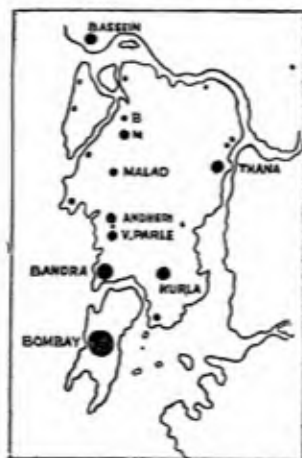


FIG. 44.—Bombay and its Suburbs.

Socially, the rise of the middle class town serves as an outlet to a working population from the crowded heart of the Island. Economically, the Salsette affords a support to the city population through specialisation. Superior economic forces in the shape of industry and commerce have driven from the city other sources—mainly agricultural—of sustenance of

the urban dwellers. Milk supply comes from the Salsette especially from the east where land values are low in the neighbourhood of the central grazing areas.¹⁵ Kurla and Chembur specialise in the meat trade. If the cotton mill industry has found its localisation in the main island, a variety of other industries have grown in East Salsette either under the patronage of the Bombay population or as a superstructure to the Metropolitan Industry. Most of these are situated along the G. I. P. route and extend as far as Ambernath. The industry in its more recent setting tries to avoid the high land values and overhead costs so characteristic of the Bombay proper, and the heavy taxation of the Port Trust and Corporation authorities, and yet tries to retain the benefit of high finance and management of the 'city', and the advantages derived from the bulk handling in the premier port of India. The Kurla Match Factory and the Ambernath Chemical Works are two leading examples of this new trend. Even the port of Bombay finds at times a serious rival in these Salsette ports where the cargo of the ocean going vessels is unloaded, and 'broken' in transport by means of country craft to avoid the dock charges of the Port Trust. Ports like Mumbra have benefited by this change. Finally, comparing the urban development of the west and east coast of Salsette, it may be seen how strongly these strips of denser population resemble their parent regions in the Bombay Island. Residential quarters on the west coast of Bombay have their continuation in the suburban Salsette. Similarly Industrial and Commercial houses of the eastern part of Bombay have their counterpart in the Salsette.

DENSITY AND SOCIAL ZONING. From the point of view of material landscape, the Bombay Island holds much interest in that it effords an example of a completely man made 'stow'.¹⁶ An area of 350 acres has been recently reclaimed. Such an extension of residential land however seems to have reached its limits in the island proper. But northwards, urban development is taking place along the salt flats that separate Bombay and Trombay, and in the Malad and Manori creeks. The metropolitan area thus exhibits all the features of human settlement in the past, and human aspirations for the future, through planning. This may be well seen in its building pattern and structures as well as in the open sites and public gardens. While the older town depicts the effects of haphazard building development, the new extensions in the outer zone are marked by more systematic planning. If the island proper is conspicuous by the absence of a 'vegetal carpet', the deficiency is more than

15. The Milk Supply of the Bombay City is one of the many fascinating aspects of Urban Geography that the city presents.

16. Unstead: *British Isles: A Systematic Regional Geography*, p. 12.

counterbalanced by the human life swarming in it. From the point of view of numbers alone the following facts are interesting. Within the central wards, Kumbharwada has a density of 727 persons per acre. This is the zone of maximum concentration. The Walkeshwar area has a lesser density. But the suburbs of Dadar and Matunga have denser population. The docks area and Colaba have almost the same density. The Fort area on the other hand has a floating population which flocks in by day and leaves the offices by evening to the residential quarters outside. This aspect presents an interesting corroboration to the life in similarly situated business portions of the metropolitan cities of Europe and America. It is a product of specialisation of functions in modern times.

Equally interesting is the other aspect of population distribution that exhibits a quasi religio-economic tendency. The Colaba and Marine Lines zone has been occupied by the rich and middle class Parsi and Anglo-Indian elements of the Community. Within the 'Indian' zone of the city, Kalbadevi, Girgaum and Pydhownie, three well marked localities of Gujarati, Deccani and Moslem population can be discerned.¹⁷ So sharp is the division between these localities that the lines of clash in times of Hindu-Moslem tension could easily be demarcated. This tendency towards a peculiar segregation is partly due to religious bias, and partly to linguistic and cultural affinities. It persists even in the suburbia although there are no such sharp contrasts as in the Island. In Ghatkoper, for instance, a large section of residents hail from Gujarat. Bandra is eminently Christian. Hindu suburban dwellers show a preference to Khar. This segregation moreover has been stimulated by the new building societies sponsored on communal basis. In the richer strata of the society however conditions of opulence seem to cut across the linguistic and religious ties. A common economic and administrative bond rooted in Western ideas of culture seems to bring the richer sections of the city together. It is difficult otherwise to explain the localisation of different communal elements in an area like Walkeshwar or the Churchgate Reclamation. Strangely enough Brunhes's distinction between the 'native' quarters and the European Garden City no longer holds true of Bombay. Economic forces have largely effaced this distinction from the regional point of view. The religious bias to urban life is not a new factor in our community nor is it restricted to Bombay alone. An average Indian city develops such communal facets within its bounds. What is surprising in Bombay is the sharp communal cleavage in spite of the higher plane of urban living. Excepting in case of the richer sections of Indian society, our social structure even in urban areas has so far failed to switch itself over, from

17. See Fig. 43: Census Report 1931, Vol. IX. pt. 1 p. 11 ff.

the age long religious differentiation to that based on economic consideration and ideas of corporate living.

COMMERCE OF BOMBAY. That the growth of Bombay has been primarily due to its commercial expansion hardly needs any emphasis. Its trade, which was insignificant under the Portuguese, received a great impetus under the East India Company, notably during the last quarter of the 17th Century due to the efforts of its Governor, Aungier.¹⁸ The coasting as well as the oceanic trade enabled the port to establish a close contact with the Gujarat Ports from which it received, principally, cotton, and, the Konkan and Malabar coast supplied indigenous products such as coir, coconuts and spices. Across the seas, Bombay developed intimate

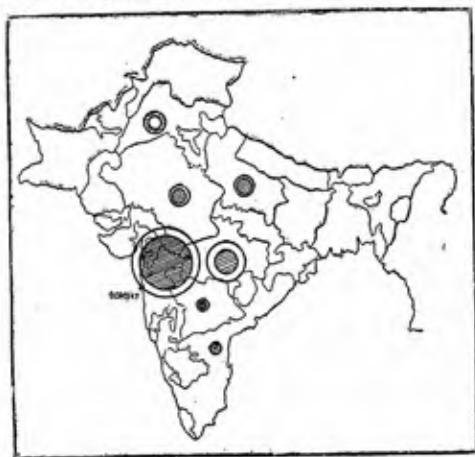


FIG. 45.—Hinterland of Bombay.

Value of Rail-borne trade. Exports—Shaded Circles; Imports—Unshaded Circles.

economic relations with Great Britain, but the traditional commercial contacts of the Western India with the Persian Gulf, the Red Sea and the African Coast, were equally well maintained.

The present character of Bombay's foreign and coasting trade may be said to be a product of the geographical conditions and the economic policies of the Government. While the hinterland has been influenced by the development of the agricultural regions of the country, and the character of markets for foreign goods, the direction of foreign trade is largely the result of politico-economic considerations such as the Imperial

18. Gazetteer of Bombay City and Island; Vol. I. p. 405.

Preference. The port commands perhaps the best hinterland due to its unique geographical position and setting. In exports, the port extends its influence as far north as the wheat producing plains of the Punjab and the oilseeds region of Madras. In imports, the markets of the home province, the C.P., C.I. and U.P. are catered for. In general, the Empire countries have the major share in the foreign trade. Before the recent war, exports consisted of Cotton, Grains, Oilseeds, Manganese, Ore and Cotton piece-goods.¹⁰ These were drawn from the province proper, the C.P., C.I., the Punjab and partly from Madras, the latter two exporting more than what they receive from Bombay. In the Empire countries, U. K. was the principal buyer, and outside it, Japan, which was our principal purchaser of raw cotton. Grains were mostly claimed by the Middle East

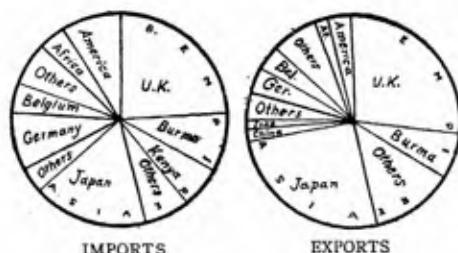


FIG. 46.—Bombay: Direction of Foreign Trade.

Countries, while industrial raw materials like Manganese, Oilseeds and Myrabolans found a market in European countries, particularly in Germany. The local Textile Industry enabled Bombay to be a leading supplier of piece goods to the East African Countries and the Middle East. In value, the imports of Bombay normally exceed exports.¹¹ The imports, as may be expected of India's leading port, comprised of a variety of articles. While grains and raw cotton formed the bulk of the coasting import trade¹² manufactured articles from U. K., Japan, Belgium and Germany, used

19. *Percentage Distribution of Bombay's Trade with foreign countries. (1938)*

	U. K.	Kenya	Burma	Br. Possessions	Belgium	France	Germany
Exports ...	26.04	1.26	7.25	47.32	3.93	2.83	3.96
Imports ...	23.32	5.64	8.90	45.81	2.21	1.29	8.81

	Total Europe	Japan	China	Iran & Persia	Total Asia	Africa	America
Exports ...	15.90	24.80	1.30	1.98	31.31	1.98	3.49
Imports ...	20.23	17.07	.91	2.31	21.26	3.37	9.33

See also Table 4.

20. This account relates to the position on the eve of the recent war.

21. Table 2.

to figure prominently in the foreign imports. In addition, the port used to receive mineral oils, including petrol, from the Persian Gulf and the U. S. A.

The whole of the eastern waterfront is thus busy in the shipping activities which have recorded considerable expansion during the last fifty years.²² This structure of the foreign and coasting trade is supported by extensive storage depots, shipping agencies, commercial firms and banks. The extent of the commercial development may be well gauged from the fact that as many as 70 banking offices of the scheduled banks, and 19 of the exchange banks are situated in the Island.²³

INDUSTRY. Although commerce gave Bombay its first impetus towards becoming the leading city of the country, Industry played no lesser role in its subsequent growth. The beginnings of Modern Industry both in the Bombay Island and in India may be traced to the establishment of a cotton mill in Bombay in 1854.²⁴ Since then Bombay has become the chief centre of the Indian Textile Industry, and the prosperity of the city has been closely linked up with the changing fortunes of this industry; and under the influence of commerce, 'high' finance, growing population, and the Textile Industries, numerous ancillary industries have found a shelter in the Metropolitan area and its suburbs.

From the regional point of view, most of these industries seem to have a haphazard distribution all over the face of the agglomeration. But fundamentally they present a pattern of their own, that has been moulded by human as well as natural factors. The Textile Industry is easily the most important industry in the city claiming more than 200 factories to its credit.²⁵ Raw cotton from Gujarat and Deccan, labour from Konkan coast, coal from Durban in the earlier stages and hydro-electricity in the later, and the rise of financiers in the city, explain its localisation. The industry has its maximum concentration in Parel where the land was adequate and cheap during the last century. It has outgrown the Parel limits and has encroached over the adjacent areas of Tardeo and Mahalaxmi on the west and the Byculla-Mazgaon area on the east. New mills have made their appearance in isolated patches in Dadar and Mahim where cheap land and easy transport facilities are available. On the other hand, the mills of the Colaba and Fort area continue their early settlement in that zone of high land values, mainly due to geographical inertia. Next in order of importance come the Engineering Industries. There are 400 factories, large and small, which are more or less uniformly distributed

22. Table 3.

23. Statistical Tables relating to Banks in India 1941.

24. Vakil: Trade and Industry in Modern India. p. 126.

25. A. I. M. O. Bulletin No. 3. p. 4.

all over the city, but show a preference to the Mazgaon-Byculla area, mainly due to the water front, docks repairs, and the railway terminus. Automobile workshops show a preference to the Girgaum and Queens Road Zone, possibly because they started their career as an auxiliary to the showrooms of the Motor Trade in this Zone. Electrical and Metalware industries have found their localisation near Kalbadevi and Golpitha. The Printing Industry which consists of over 200 presses is, for obvious reasons, localised in the more enlightened sections of the city: nearly half of them are situated in the Fort; most of the remaining find scope in Kalbadevi and Girgaum. Food industries are a new feature and these are located at Mazgaon and Byculla where transport facilities make the bringing of raw materials and despatch of the finished products comparatively easy and cheap. Drugs and Chemicals, similarly, have grown near the rail road, and are increasing in number in the suburban zone where land is still cheap. The Leather industry is naturally situated in the neighbourhood of the slaughter houses of Kurla and Chembur, while the Furniture Industry is largely concentrated in the Mazgaon-Reay Road and Dharavi areas.

ADMINISTRATION Administrative centralisation has further given the city a monopolistic importance. A large section of population thrives on Administrative offices and ancillary occupations. The Central Offices, the Provincial Secretariat, the University, the Railways are the leading influences which forge an administrative unity. Banks and other joint stock enterprises mostly localised in the Fort Area, affirm this unity from the economic side. Such concentration of administrative and economic functions has created an environment promoting cultural aspect of the urban community. The importance of the Metropolis is further enhanced by the facilities of higher education and social amenities on a scale not found in lesser urban agglomerations.

URBAN PROBLEMS. Yet, Bombay is not without its problems. A criticism is levelled at the city that the port tries to monopolise India's foreign trade and does not brook any competition from its lesser rivals. Many industrial elements are already trying to escape what they would prefer to call the 'tyranny' of Bombay, by resorting to other ports on the Western Coast. It is unnecessary to enquire whether the charge is true. It is equally a fact that Cochin and Kathiawar Ports are vigorously developing their trade. From a larger point of view however an unhealthy competition between Bombay and other ports need not exist. The growing internal as well as foreign trade can be better fostered through all the ports of India without allowing them to engage themselves in an unhealthy competition.

The localisation of the Cotton Textile Industry on its present basis is seriously challenged by the economists. The high land value and labour charges, the necessity to obtain coal from long distances and the unsuitability of the industry for the production of coarser fabrics are the main points of criticism in this respect. Advantages of expert management and finance, and the increasing of hydro-electric power have to some extent mitigated the handicaps of higher cost of production. The recent depression in the industry made these drawbacks more apparent, and it incidentally brought out the superior position of the industry at Sholapur and Ahmedabad. Fortunately a realignment of the Bombay Industry is proceeding, and happily for the port, it has created many new industries.

Similarly administrative and social importance of Bombay has to some extent been affected by the recent constitutional changes. The Reforms of 1935 have detached that important portion of Western India, from Bombay—The Indian States. On its social and cultural side the rise of cities like Poona and Ahmedabad has tended to reduce the importance of Bombay. But in spite of these centrifugal tendencies, the metropolis does not show any signs of decline. Urban growth, as statistics prove, has continued both in intensive and extensive form. Electrification has widened its territorial limits. New industries support a growing population. Commerce, except during the period of last depression, has not declined. The metropolis on the whole, with its satellite towns, maintains its youthful vigour and manifests all the aspects of a modern conurbation.

The Ulhas Basin

North-east of the Salsette Island and bounded by the Tansa and Patalganga rivers, lies the Ulhas Basin which in its physiographical setting differs from the rest of Konkan in two respects. It has a fanlike orientation towards Bombay. Here the Konkan Coast lands recede in the Sahyadries to form an arc, and produce a comparatively level region. Secondly, the neighbourhood of Bombay has fundamentally influenced the human geography of the basin, with the result that in both these respects the Ulhas Basin stands out as a separate region. The river Ulhas with its two leading tributaries on the north drain this arc. It is probable that this region has undergone a period of intense erosion and deposition. The recession of the Sahyadries in this section seems to support this view. The region constitutes a plain much interspersed by residual hills. From the agricultural point of view however this has hardly made any difference. In the high-land zone of poorer soils inferior crops like Nagli are raised. Towards the west, rice gains importance along the lower hill terraces and on the lowlands. In the tidal limits which are fairly extensive

along the Thana and Bassein Creeks, brackish soil and swampy vegetation mark to an important degree the nature of land utilisation.

The distinctiveness of the Basin however lies not in its agricultural production, but in the position it occupies between the metropolitan region and the agricultural land of the Maharashtra plateau. The mountain barrier is naturally pierced in three places. The Thal Nana and the Bhor passes. Human interest attaches itself to the rail and

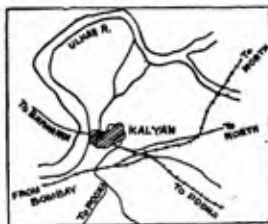


FIG. 47.— Site of Kalyan.

road routes traversing the Basin and connecting the distant parts of north and south India. Kalyan (pop. 31,000) is the route centre of the Basin, and therefore commands the region in its economic aspects. The cultivated valleys support tiny but numerous rural settlements while larger villages cling to the modern arterial routes. A touch of modernity is lent to the natural landscape by the construction of railways to generating stations of Khopoli and Bhivpuri, and by a succession of H. E. high tension pylons that are now carrying the H. E. energy to Bombay and its suburbs. The vast traffic between Bombay and Poona and Nasik, and the seasonal migration to Matheran convey an impression that the Metropolis is unwilling to leave even these distances uninfluenced.

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TABLE I

Growth of Bombay and its Suburban Towns.

		1881	1911	1921	1931	1941
Bombay City	...	773,196	979,445	1,175,914	1,161,383	1,489,883
WEST COAST :						
Bandra	...	14,987	24,286	29,271	43,290	71,789
Parle-Andheri	...	...	...	...	18,400	38,493
Malad	...	...	...	...	7,723	12,212
Juhu	...	...	...	...	1,851	3,393
EAST Coast :						
Kurla	...	9,715	15,081	26,059	30,311	39,066
Ghatkoper	...	...	...	8,094	8,168	18,176
Thana	...	14,456	15,591	22,639	21,816	29,700

TABLE II

Port of Bombay—Growth of Trade.

Total Value of Exports and Imports.

(In Rs. ; 000 omitted.)

		1891-02	1850-51	1900-01	1929-30
Exports	...	89,70	5,71,33	24,77,55	1,02,02,00
Imports	...	72,31	4,54,57	29,42,61	1,09,71,00

TABLE III

Port of Bombay—Development of Shipping.

(In Tons.)

		1891-02*	1850-51*	1900-01*	1938-39
ENTERED :					
Foreign	...	29,640	165,071	1,534,079	4,170,563
Coasting	...	27,435	444,648	570,230	2,250,368
Total	...	57,075	609,557	2,104,309	6,420,931
CLEARED :					
Foreign	...	36,205	161,250	1,278,904	3,614,330
Coasting	...	23,684	472,129	2,221,679	2,795,919
Total	...	59,889	633,379	3,500,583	6,410,249

* Averages.

TABLE 4.

Details of Imports & Exports (Principal Commodities).

Imports			
Commodity.	Unit.	1st April 1939 to 31st March 1940.	Corresponding Period 1938-39.
Cement, Lime and Limestone	... Ton	51,520	40,086
Chemicals and Drugs	... "	62,036	45,812
China and Fireclay	... "	24,450	28,077
Coal	... "	100,454	147,095
Cotton Raw	... Bale	804,014	1,006,681
Glassware	... Ton	7,254	8,570
Grains {	Wheat	105,623	148,208
	Rice	410,410	305,942
	Other kinds	36,621	23,676
Government Stores	... "	13,634	8,657
Hardware	... "	25,857	30,451
Iron and Steel	... "	42,661	50,803
Machinery	... "	66,146	82,411
Manure	... "	24,536	16,423
Motor Cars and Lorries	... Package	14,361	10,500
Oil—Linseed, etc.	... Ton	34,653	26,981
Oil—Mineral : Kerosene	... Gallon	47,911,785	48,816,702
Do. : Petrol	... "	28,248,798	28,659,724
Fuel Oil and other heavy Oils	... "	84,682,206	83,885,135
Oilman Stores	... Ton	14,522	10,042
Paper and Stationery	... "	48,937	48,553
Piece goods	... Package	234,694	227,919
Silk Raw	... "	12,026	9,985
Sugar	... Ton	101,355	14,851
Tea	... Package	37,037	177,716
Timber and Planks	... Ton	83,967	77,847
Twist and Yarn	... Package	216,274	140,409
Exports			
Wines, Spirit and Beer	... Gallon	1,012,001	1,421,568
Coal (including bunkers)	... Ton	129,578	40,306
Cotton Raw	... Bale	1,618,069	1,474,105
Grains {	Wheat	10,713	10938
	Rice	75,200	72981
	Other kinds	116,964	136,867
Groundnuts	... "	95,614	70,922
Manganese Ore	... "	72,493	49,224
Myrabollams	... "	37,652	36,251
Oil—Mineral : Kerosene	... Gallon	6914,699	6,311,754
Fuel Oil (including bunkers)	... "	16,558,431	15,891,589
Oil Cakes	... Ton	161,476	227,461
Piece-goods	... Package	341,156	386,273
Seeds	... Ton	219,120	274,601
Twist and Yarn	... Package	89,313	128,792
Wood	... "	49,655	35,842

TABLE V
Leading Industries of Bombay.

	No. of Factories	Labour Employed
Textile	208	2,00,000
Engineering	404	40,000
Paper	207	8,000
Food etc.	88	4,000
Wood	45	5,200
Leather	11	1,000
Oil	24	2,500

CHAPTER IX

South Konkan and Goa

The Coast from the Patalganga river to the Terekhol creek marking the Portuguese Frontier, can be described as a physiographical extension of North Konkan. General relief features are almost similar, except in case of laterite tracts which introduce sharp changes in landscape and economic development. The buttress of the Sahyadries is continuous and the highland tracts descend abruptly in steps to form the lowlying coastal lands of South Konkan. Whether the Konkan coastlands are the result of marine denudation or an edge of the faulted plane characterised by local volcanic effusions, the local topography is much influenced by the vast consequent river erosion and deposition taking place after the long period of quiescence.¹ Geologically most of the area belongs to the Deccan Trap. Only the Sawantwadi end is underlain by gneissic formations. Recent sub-aerial and marine deposits dominate the landscape of the river basins and coast line. Purely from the point of local relief and human geography, therefore, the Konkan laterite, riverine and coastal alluvium and sandy stretches are important. The basal formation of the Trap rock and gneisses do not directly affect land use. Even this geological distinction between the trap and gneissic areas is obliterated in many places by a uniform extension of laterite.

Except for the local shore line stretches and estuarine areas, the South Konkan 'plain' may be more aptly described as a series of dissected plateaus. A system of parallel flowing rivers have carved out broad valleys in the Kolaba region. In Ratnagiri, valley development is much more restricted by the overwhelming domination of the laterite. How rapid is the erosion may be gleaned from the large scale topographic sheets indicating the wide extension of the tributaries, and, the sharp bends of many rivers almost suggest a process of river capture, in many places. Towards the coast, deposition is naturally prominent due both to riverine and tidal action. Differential marine erosion has given rise to a series of alternating headlands and bays like the Suvarna Durg promontory and Harnai bay. Southwards the coastline is straight and unbroken.

AGRICULTURE. From the point of view of human relations, the river valleys and the coast line hold greater interest than the laterite tops.

1. Wadia: *Geology of India*, pp. 24 and 282. Krishnan: *Geology of India and Burma*, p. 44.

How the laterite produces a negative region standing in sharp contrast to its surroundings has been discussed elsewhere in this study.² In South

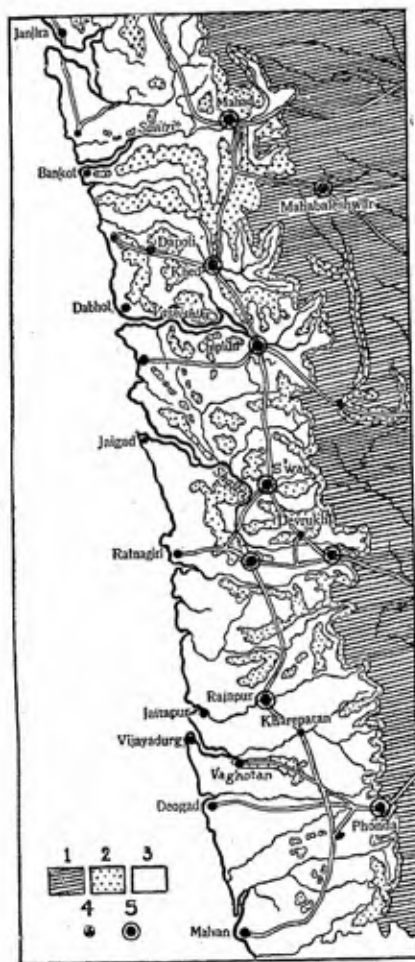


FIG. 48.— South Konkan.

1. Land over 2000 ft. 2. Bet. 2000-1000 ft. 3. Below 1000 ft. 4. Ports.
5. Nodal Towns of the Interior.

2. See above page 93.

Konkan, particularly in the Ratnagiri district, laterite extends over a major area and thus accounts for the agricultural poverty of the region, and the human concentration along the alluvial stretches of the river valleys, where life bustles with activity on the rice fields.³ Rice has a remarkable tendency of displacing every other crop in monsoonal region because it is capable of supporting a larger number. This accounts for the immense variation in the quality of the crop raised to suit the local soil and climatic factors. In South Konkan, beyond the alluvial soils,

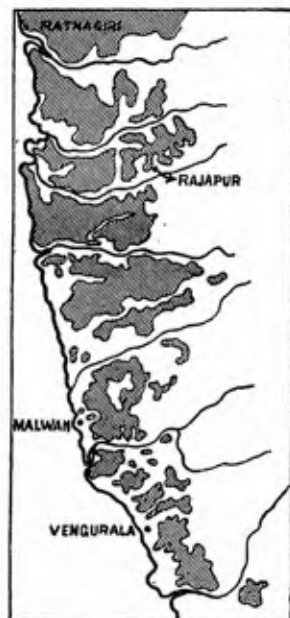


FIG. 49.— Laterite in South Konkan.

rice is grown along the lower terraces of the plateaus. Towards the sea, man continues his efforts to bring more land under rice by means of Kharepat cultivation.⁴ In brackish soil tracts, an inferior quality of rice is raised. Only those parts where rice cannot be grown are given to cocoanut, along the sandy beaches, and to ragi in the hill regions. Pulses are raised in the rice fields as crops of the cold season. Sugar cane is raised where soil and water supply are favourable. Cultivation of the rice

3. The nature of land utilization brings out the poverty of the region; See Table I.

4. This is particularly extensive in Alibag and Pen taluka. Kolaba Gaz., p. 90.

on the whole is intensive in the Alibag Coastal tract and in the Savitri valley. An interesting point in crop production is the absence of spice gardens, which is presumably due to the lack of evergreen strands of forests in the Ghats of this region.⁵ In spite of the intensive development of rice lands, poverty is the keynote of South Konkan. It is unrelieved by any other economic factor, and agriculture has its obvious limitations of soils and water supply.⁶ Rainfall although abundant in the season, does not promote intensive production on the basis of irrigation owing to its extremely rigid monsoonal periodicity. A heavy programme of capital expenditure is necessary if the rain water is to be impounded on the Sahyadry tops and allowed to run both for the purpose of H. E. energy and irrigation. It has immense scope, as can be seen from the Tata enterprise in the Mulshi valley. It would also solve the problem of domestic water supply so keenly felt in this part of the Konkan, during the summer months. Influence of the Arabian Sea, in spite of the historic maritime role of the Konkan population, is not economically important. Local shipping works under a handicap due to the competition of the steamship lines from Bombay. Fisheries hold out a promise along the Jaygad-Malwan grounds, but for the present the trade is mainly local. Distant markets have been hardly developed on the systematic basis. Industrial possibilities there are few.⁷

MIGRATION. The Konkan Population has two interesting aspects: a migratory character, and a small element in urbanisation in spite of the heavy density. Migration to other parts of the Province is almost entirely due to the poverty of the home resources and the heavy pressure of population. Most of it is from Ratnagiri. Here, the proportion of the migrants to the resident population is almost 1:5, which is the highest in the Province.⁸ It is well known that most of the migrant stream is attracted to Bombay in Industry and Domestic Service. Of the two lakhs and half emigrants to the city, 22000 are attracted to the Textile Industry, about 2300 to the Police Force and 2000 to Domestic Service. Emigrants to Bombay are predominantly young, 64% of them being in 15-40 years age group; there is also a great disparity according to sex, quite obviously due

5. The area under spice gardens in the Ratnagiri and Kolaba Districts is about 1700 acres as against 4300 acres in North Kanara. Season and Crop Report, 1940.

6. D. L. Sahasrabudhe: Soils of the Bombay Presidency.

7. The Report of the Bombay Economic and Industrial Survey Committee mentions fruit canning and preservation, fisheries and coir, as the only industries capable of development. Ratnagiri p. 19.

8. Emigrants from Kolaba were only 32,000 as opposed to 237,000 from Ratnagiri. The total population of the District was 1,300,000. Out of every 1000 emigrants to Bombay, 204 came from the Ratnagiri Districts. Census Report (1931) Vol. IX. Pts. I & II.

to the demands of Industry and other avenues of employment; 57% of the emigrants are males, 12% females, and 37% is the element of dependants on the working emigrants. It is only in the textile industry that women find employment.⁹ Again, it is essentially a working class migration dominated by the Marathas. But it is also marked by a movement of middle class population seeking a career in Professions and Administration. It would be interesting to study the economic and social significance of these coastal migrations to Bombay. To what extent these heavily populated coastal areas depend on Bombay could be statistically gauged with reference to the coastal, road and rail-borne trade returns, and, the Post office and Bank returns relating to the earnings sent by the workers in Bombay to their dependants at home.

- ✓ TOWNS. The second outstanding feature of the population is that the urban element is only 10% and is restricted to a few points like Mahad, Chiplun, Ratnagiri, and Malwan. These owe their origin largely to their site. Their limited growth is due to the poor response of the surroundings. Historically many changes have taken place in their relative importance. Along with the other western ports, Chaul, Janjira, Bankot, Mahad, Dabhol, Kharepatan and Vengurla, were points of contact in the trade of the Arabian sea.¹⁰ Mhpral and Kharepatan at the navigable end of the rivers find a mention in the earliest records. Before the rise of Bombay, each of the South Konkan ports owed its importance to the plateau hinterland connected through the Ghat Passes. Chaul situated at the mouth of the Kundalika Creek, was a prosperous port under the Portuguese. It had fostered trade with the Deccan through the Bhor passes. Later, Chaul became a much contested possession in the struggle of the Portuguese with the Marathas. Mahad and Chiplun have an interesting position, and they illustrate the influence of physical configuration on urban development. Situated at the navigable ends of rivers, both are natural route centres, necessitating transshipment of articles.¹¹ Mahad (pop. 8,000) controls the Ghat routes via Mahabaleshwar. Before the rise of Bombay it had a large seaborne trade. But now it retains its urban appearance largely because of the nodality of roads. Chiplun (pop. 15,000) was a flourishing town in the days of pack bullocks and carts. It was a transit station with Govalkot and Dabhol as its ports. With the development of

9. The following are the figures relating to employment :

Workers	Textile	Other Industries	Transport	Trade	Public Force	Domestic Service	Others
88,000	21,000	3,700	3,300	1,800	2,300	2,000	15,000
The Marathas number 135,000.							

10. Ratnagiri Gazetteer. p. 174 ff.

11. Cf. Vidal de la Blache: 'Principles of Human Geography'; p. 473.

mechanical transport it has lost this function, but it manages to retain its urban importance on local trade and administration. A distinguishing feature of these Konkani towns is their lowland position. In Kanara such route centres in the interior are either the Gap Towns situated in the *Ghats* interior or in the Transitional Zone on the Plateau.¹² Relief does not favour such lowland urban development in Kanara. In South Konkani, on the other hand, the urban bias tends towards the *lowland* towns of the interior, and ports like Dabhol therefore have had a much restricted development.

Goa

In its geographical setting, the Portuguese possession of Goa is an extension of the Konkani plain, with this difference that the alluvial stretch surrounding the Aguada is much larger than any such parallel tract in Konkani. More striking is the contrast in human geography. A long period of



FIG. 50.—Administrative Divisions and Natural Regions of Goa.

1. Novas Conquistas. 2. Bardes. 3. Ilhas. 4. Marmagao-Margao Region.

Portuguese occupation and the influence of Roman Catholicism have changed the material landscape of the region. Goa therefore may be rightly described as "a cultural break" in the maritime plains of Western India

RELIEF. Of the Portuguese possessions in India, Goa, is the largest.¹³ It is the centre of the Portuguese administration. It has an area 1300 sq.

¹² See above p. 101.

¹³ Table III.

miles, and a population over half a million. The relief is characterised by the highland back-bone of the Sahyadries with its transverse members reaching in many places the shore line. The foot-hills which form the junction between the highland and the riverine plains are marked by an extensive development of the 'low level' laterite. On the other hand, the low lying region surrounding the Aguada and Marmagoa Bay is underlain by extensive deposition of alluvium. So intense and active is the process of deposition that it has given rise to the formation of islands (Ilhas) with a pattern of criss-cross and sluggish drainage which separates them from each other. Only the low line of hills ending in the promontories of the Aguada, Cabo, Marmagoa point and Cabo Ramas, introduce variations in the relief of the riverine plain.

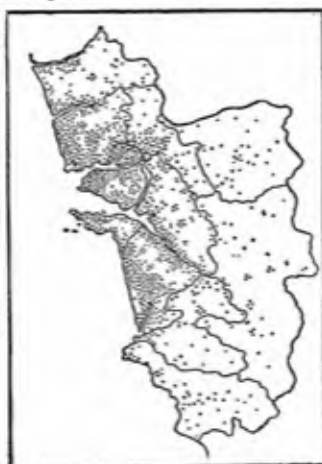


FIG. 51.—Distribution of Population.
1 dot : 500 persons.

ECONOMIC DEVELOPMENT. Economic Development follows closely the nature of relief. The coastal plains of Pernem and Canacona and the riverine tract of the 'Ilhas' and Salcete are regions of intense economic development owing to rice and coconut cultivation.¹⁴ This economic advantage is supported by the commercial growth of Marmagoa and the administrative importance of Nova Goa. Population is dense and fringes the shore line. In the interior, this belt of rice cultivation sends, as in Kanara, 'lobes' of cultivated territory along the major river valleys, but

14. Only one third of the total area is under agriculture, and an area of about 116 sq. miles is under forest. Laterite thus severely controls the productivity of Goa.

in the highland areas it is quickly succeeded by forests where lumbering, cashew distillation, and to some extent, "shifting" cultivation, are practised. Population in the highland belt that abuts the British territory and the Sawantwadi State, is thin and backward.

This physical contrast between the plains and the highlands of Goa is well reflected in its political and cultural development. Early Portuguese conquests were limited to the natural limits of the plains and slightly beyond them. In the struggle with the Bahamani rulers, the Portuguese Sea power could not extend much into the interior and it preferred to consolidate its hold in the lowland areas.¹⁵ These territories after their conquest of the highland interior came to be known as the Velha



FIG. 52.— Distribution of Christian Element in major settlements.
Christian Population—Shaded.

Conquistas in distinction to the later annexations, the Novas Conquistas. In its cultural setting this distinction derived a firm root in the religious policy of mass conversion pursued by the Portuguese. Over 43% of the total population of Goa are Catholics. But a very interesting fact about them is their close correspondance to the territories of the Velha Conquistas. The material landscape of the "old territories" is much influenced by Catholicism. Churches dominate the landscape. The high proportion of Catholic population and the Portuguese language introduce a Latin atmosphere in these tracts. Quite in contrast to this region, lie the Novas Conquistas. These are the isolated and forested zones of the Sahyadries. The predominance of the Hindu population and the Hindu Temples show

15. Danvers : Portuguese in India.

that the Portuguese cultural influence reached only to a small extent in these lands. The Novas Conquistas still preserve their early Hindu Culture and tradition, although most of it is a poor, backward and unhealthy region.

Sub-regions of Goa.

Relief offers a primary basis for classification into low-lands and highland belts of Goa. But economic development and cultural relations give a suitable basis for a further sub-classification of the regions.

THE NOVAS CONQUISTAS. These are the outer districts occupying nearly two thirds of the total area. Population density varies from 24 to 205 persons per Km. These territories almost form an arc of hilly zone around the riverine plains. It is backward in economic development, and thinly settled by a population that is predominantly Hindu.¹⁶ Route centres like Ponda are important. But Hindu temples like Shanta Durga, Ramanathi and Mangeshi, attract devotees from long distance, and lend economic support to the local population that clusters round these shrines.

THE BARDEZ. This is the northern coastal region extending from the Aguada Bay to Chapora river; agriculture is intense, but dense population promotes a stream of emigrants to other parts of India and to Africa. Much of the economic prosperity of Bardez depends on the earnings of these emigrants. "Bungalow" Villages,—large rural settlements consisting of modern buildings, which are out of tune with the rural surroundings—are the products of wealth imported by the emigrants. The influence of the English language in the District shows the link of the local population, with the British India, its commerce and administration. With its enterprising and energetic population, the Bardez easily stands out as the most progressive region of Goa.

THE "ILHAS". The alluvial formations between the Aguada and Marmagoa Bays are the oldest regions of Goa, as may be seen from the ancient seats of administration of the Kadamba rulers, near Old Goa, Goa Velha, and near Verem, north of Panjim. Muslim fortifications and the Portuguese administrative centres indicate the strategic importance of this region. The Islands in the interior produce rice; coconut production increases towards the coast lands. But an appreciable proportion of land

16. Proportion of Hindu Population to the Total in Novas conquistas.

	Pernem	Sanquelim	Satari	Ponda	Sanguem	Quepem	Canacona
Total ..	47,000	36,000	18,000	55,000	20,000	24,000	20,000
Hindu ..	34,000	31,000	16,000	44,000	15,000	12,000	14,000

is marshy and has a mangrove vegetation. The coastal strip of Panjim and Old Goa, dominates human activity through administration and commerce. It is interesting to note in this connection that human importance is migrating west-wards, as in North Kanara, from the interior to the sea, owing to the alluvial deposition at the mouth of the rivers. Goa Velha, which is now nearly 16 miles in the interior of the river mouth, was once the famous seat of administration of the Kadambas. The site of Old Goa became more important later. In the hey day of the Portuguese power, Old Goa with a population of 200,000 was described as the Lisbon of the east. The decline of the Portuguese and further silting of the Estuary have left Old Goa in ruins, encroached by vegetation, with only a few churches and monasteries of importance to remind of its glorious past. Panjim (pop. 11,153) with its environs is the most important urban centre because of its administrative centralisation and local commerce.

THE MARMAGOA PORT AND MARGAO REGION. Economic activity continues at greater pace along the southern bank of the Marmagoa Bay. The port of Marmagoa (pop. 3865) dominates the region. It owes its development to its natural harbour. The projecting laterite bluff gives a safe natural anchorage in the Bay and has been further improved by a cement bar across the Zuari Estuary. It is the third leading port on the west coast, closely following Bombay and Cochin in the coasting and foreign trade.

The town of Marmagoa has very little of interest to offer except its harbour and the air landing ground on the plateau top. It consists almost entirely of ware houses, customs building and the quay. While the southern zone of the Marmagoa Bay is dotted with series of hamlets, human activity displays a greater vigour along the railway route which connects the port with Londa. About two miles behind Marmagoa is the town of Vasco Da Gama (pop. 6,719) which on account of its situation on the plains wears a cleaner and more urban appearance than the port itself. The longitudinal plan of the township in which buildings are constructed on either sides of the main road indicates the importance of the routes that pass through. Vasco may be well described as an economic appendage of Marmagoa. The environs of the harbour are not only crowded and unhealthy, but hold no scope for further urban development. In Vasco Da Gama therefore has the commercial community found a solution to urbanisation in its healthier site and proximity to the harbour. Further in the hinterland lies the nodal town of Margao (pop. 11,002) which is the economic focus of the upper regions of the Estuary.

GOAN MIGRATION. As is the general feature of all the overpopulated coastlands of India, Goa draws its economic support from a large stream

of emigrants to other parts of India and to some extent to the Portuguese East Africa. The number of total emigrants may be estimated at 65,000 persons. Quite a substantial element is absorbed in the Bombay Province. The city itself attracts nearly 40,000 Goans. Even in other parts of the province, it is the town that brings the Goan population in search of employment and professions. Poona, for instance, has a population of 10,000. The Portuguese East Africa, owing to colonial relations, draws about 2,000 persons. It is interesting to observe in this respect that most of the migrating population is attracted to middle class professions, and domestic service, and that the percentage of female element is high in case of Goans, which is quite unlike other migrating streams in India. The Christian element naturally dominates this outward movement, and, regionally, the movement is strongest in the districts of Salcete, Bardez, Pernem and Ponda. It is unnecessary to dwell upon the economic significance of this migration. It has considerably eased the pressure on home resources. It has further enabled at least a section of the Goan population to maintain a better standard of living with the help of their earnings from the external regions. How highly is this advantage of migration, prized by the Goan community can be seen from the steady development of educational institutions seeking affiliation to the Bombay University, and accepting English as the principal medium of instruction. The 'Anglicised' cultural landscape of the Bardez region is in no small measure due to the premium that the local population places upon their economic contact with the British India. In addition to this economic aspect, the Goan migration possesses a deeper social significance. The migration does not consist of a stream of persons wishing to make the lands of their economic enterprise, their permanent home. So strong is the sentimental tie of the community, that few Goans prefer to reside outside Goa. There is thus an outward flow of youth, energy, ambition and enterprise, which strives to build up the economy of the motherland, and a returning, stream of mature age, experience and economic strength, which ably supports the next generation in this national enterprise. This is what endows Goa with her dynamic personality. This is the living contact, which makes for exchange of culture and thought, and on the economic plane promotion of trade and industry, between Goa and other parts of India.

GENERAL REFERENCES.

1. District Gazetteers : Kolaba and Ratnagiri.
2. N. G. Chaphekar : '*Chitpavan*'.
3. Imperial Gazetteer of India ; Vol. IX.
4. Censo Da Populacao ; Vols. I & II.
5. Carta Do Territorio Portuguez De Goa.

TABLE I

South Konkan Representative Crop Production (in acres).

Taluka	Rice	Ragi	Pulses	Coconut	Mango Trees	Cult. Area	Forest	Other Area not available for cultvn.	Total Area
Malwan (C)	27,000	7,000	6,000	4,000	1,900	101,000	650	49,000	152,000
Ratnagiri (C)	28,000	8,000	2,900	1,900	3,000	162,000	50	101,000	265,000
Chiplun (I)	64,000	64,000	800	..	250	206,000	590	66,500	274,000
Alibag (C)	39,000	..	2,200	1,100	210	65,000	35,000	18,000	122,000
Mahad (I)	35,000	16,000	5,000	..	22	192,000	34,000	63,000	291,000

TABLE II

Population Density in Select Talukas.

Taluka	Total Population	Density per sq. mile	Per Cultivated sq. mile	Total Area in sq. miles
Malwan (C)	119,000	503	726	238
Ratnagiri (C)	160,000	387	641	415
Chiplun (I)	133,000	311	434	429
Alibag (C)	93,000	483	930	193
Mahad (I)	122,000	266	406	460

TABLE III

Portuguese Possessions in India; Area and Population.

	Area in sq. miles	Population
Goa ...	1301	505,281
Daman ...	149	58,001
Diu ...	20	16,688

TABLE IV

Proportion of Christian and Hindu Population to the Total in Velha Conquistas.

	Bordez	Ilhas	Marmagao	Salcete
Total ...	116,000	67,000	25,000	122,000
Christian ...	67,000	37,000	15,000	93,000
Hindus ...	37,000	24,000	7,000	13,000

CHAPTER X

Gujarat

In physiography, the Gujarat plain offers many aspects of distinction to the rest of Western India. It is a plain of deposition developed by the Sabarmati, Mahi, Narbada and Tapti rivers. For the major portion it is underlain by recent alluvium. Only detached portions of the Trap Plateau, like the Pavagarh Hill and Rajpipla, hills introduce variation in relief.¹ The landscape however is considerably influenced by the underlying alluvial and sandy soils formed on the deposited material and brought down by the rivers from the highland regions of Central India.² In general, the plain forms an arc of lowlands backed by the hill chains of Central India. East of the Palanpur Gap, this upland backbone is almost continuous as far as the Narbada Rift. In the southern region it is pierced by the rifts of the Narbada and Tapti. In addition to the lowland character of the Gujarat Region, its second feature of importance is its orientation to the Arabian Sea through the Gulf of Cambay. This physical configuration has forced human activity along the Coastline. Alluvium has obviously favoured agrarian development on a large scale, except along the sandy coast and the highland fringes in the north-east forming a junction with the Central India Plateau, and in local stretches of sandy soil and gravel. In these areas, poor soils yield poor results. Agricultural development has mainly taken place along the central belt.³ The coastline in spite of its agricultural limitations has played a decisive role in the economic history of the region. In the highland zone human interest adheres to the lines of communication connecting Gujarat with Central India and Malwa. Climatic variations have affected in an important degree the agricultural production in north and south Gujarat. This variation in relief and climate affords a suitable basis for a sub-division of geographical regions of Gujarat.

1. Wadia : Geology of India, p. 195.

2. "Operating the higher areas, those, according to location, rapidly remove the finer particles of the soil on which the crop-bearing of these sections depends, thus reducing fertility to vanishing point and turning what was possibly capable of crop growth, if properly administered, into unproductive sub-marginal waste land, while in the lower reaches, the fertile valley of the past, they tend to the undue deposit over the fertile surface of coarse and useless detrital matter, to the filling up waterways and lakes, the ruin of irrigation works and like examples of economic loss." R. G. Allan : Soil Erosion in Western India.

The Tapti Mouth

The coastal strip lying between the Damanganga and Kim rivers offers many transitional features in regional geography, and thus

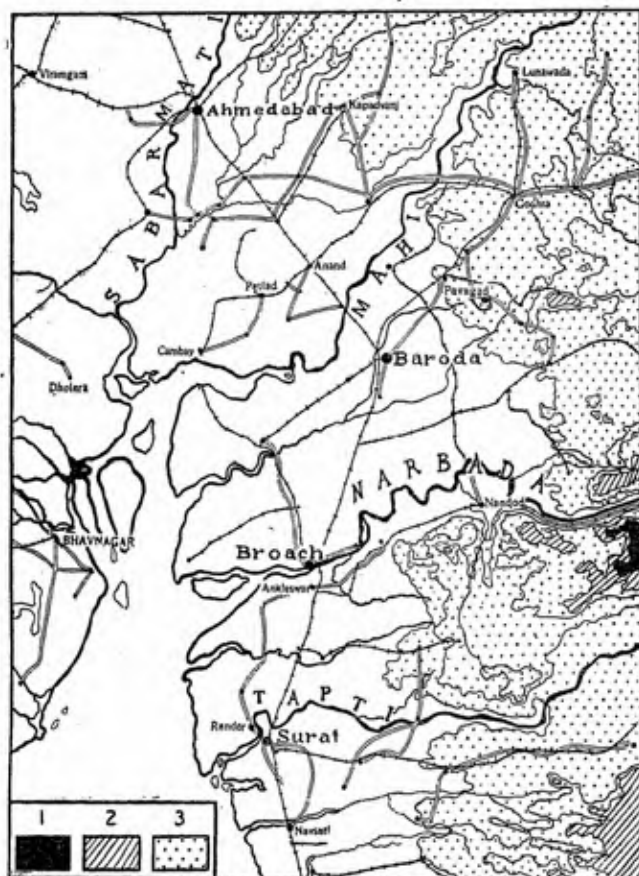


FIG. 52.— Gujarat.

1. Land over 3000 ft. 2. Between 2000-3000 ft. 3. Between 1000-2000 ft.

stands out from the rest of Gujarat. In fact this stretch marks the transition between Konkan and Gujarat. In relief, climate and

economic development this gradual change is apparent. North of the Damanganga river the crest line of the Sahyadries recedes from the coast and finally ends abruptly to develop the Tapti rift. Its western flank throws, as in Konkan, a series of spurs running at right angles to the main axis. This region of spurs is succeeded by a north-south belt of coastal lowlands, which merges seawards into the sandy strip of the shoreline. Drainage is parallel. From the point of view of detailed studies, it may be more aptly termed a zone of parallel valleys dominated by the Tapti mouth. The streams emerge from the Sahyadries to develop alluvial basins in their middle reach and lower reaches. In the upper reaches and at the mouth, the valleys are covered by poorer material consisting either of eroded debris or marine sand. From the economic point of view therefore the Central belt forms the most valuable zone producing the major crops. Regional Crop production is controlled by the distribution of alluvial soils and is also influenced by the rainfall which declines in amount northwards. Rice, Jowar, Wheat, compete in production. These are closely followed by Cotton and Tobacco along the northern edge. Sugar is cultivated in wetter tracts. In the southern talukas of Surat an appreciable percentage of land has been reclaimed from the sea for rice. Naturally the population density varies with the intensity of production. Human interest, while adhering to the coast line, finds an urban development at the mouth of almost every estuary. The Portuguese township of Daman (pop. 3500) influences the economic activity of the southern part. The Damanganga valley is succeeded by a highly dissected and infertile stretch surrounding Pardi. The narrow Auranga valley is controlled at its mouth by the port of Bulsar (pop. 20,000). Navsari (pop. 24,000) is the third minor port of the region. Situated at the mouth the Purna river, it acts as a nodal centre to the Dangs hinterland, and, has in recent times received a considerable stimulus from the Baroda Government, of which it is a part, in industrial and commercial development. Cotton textiles and engineering industries mark its urban landscape. Towards the Tapti mouth, human interest has a concentration in villages surrounded by sandy stretches and swamps, but sustaining their life on the fresh water supply from the sand beds. But it is naturally the city of Surat that dominates the human geography of Southern Gujarat.

SURAT. (Pop. 170,000) The city of Surat is the economic focus of the region. Situated on the southern bank of the Tapti mouth, it is the

3. Crop production in select Talukas (in Acres):

	Rice	Jowar	Wheat	Cotton	Total cultd. area	Total Area
Pardi (S. Coast) ..	24,000	..	200	..	91,000	104,000
Bardoli (Interior) ..	10,100	10,000	1,000	26,000	80,000	92,000
Olpad (N. Coast) ..	2,200	19,000	9,400	53,000	111,000	169,000

Rice thus dominates the southern talukas, and Wheat and Cotton, the northern.

leading commercial centre of Southern Gujarat. Its original site seems to have been determined by the Tapti bend downstream and the higher position of the ground in a generally marshy region. Historically its prosperity dates from the early Hindu Period.⁴ It continued during the Muslim rule. The port became particularly important in the days of European rivalry on the West Coast. The English factory at Surat attracted commerce and industry to the town. Population recorded a great increase. The city became an administrative centre of the East India Company in its early history on this coast. Its indigenous industries like gold and silver thread became famous. Its exports in the days of the Company consisted of these articles. Prosperity however could not be retained long.⁵ The Tapti mouth was rapidly silting up. On the other hand progress in oceanic navigation necessitated deeper harbour

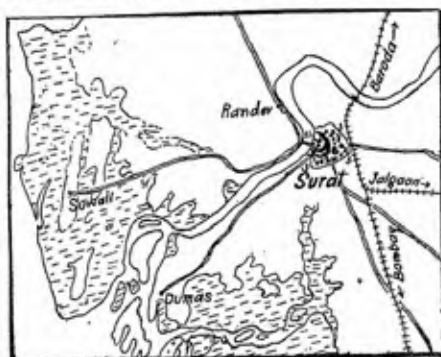


FIG. 53.— Site of Surat.

1. Fort. 2. Old Town. 3 Suburban development. Shaded : Marshy areas.

facilities. These handicaps were partially overcome for the time being by developing the port Suwalli Roads. But ultimately the choice fell upon Bombay. Along with the transfer of the English administration to Bombay went the commercial prosperity of the city. During the 18th and 19th centuries the city recorded a considerable decline in population and economic condition.⁵ With the construction of the B.B.C.I. route it has partially recovered its fortunes. Economic stagnation continues and the city now serves as a commercial centre only of local importance. But in its new setting much industrial enterprise is flowing in. The famous gold and silver thread industry still attracts

4. Altekar; History of towns and cities in Gujarat and Kathiawad; (Indian Antiquary; Vols. L III—L IV) : p. 17.

5. Surat Gazetteer : p. 318 ff. See Table IV.

over 11,000 workers and has on average production easily worth Rupees 9 lakhs per month. There are as many as 71 textile factories, of which 23 are devoted to the production of silk. The silk industry for which Surat is even now well known employs 6000 workers.* These economic and historical aspects of the city have left a permanent mark over its present pattern. The nucleus of the city is the original site of fortification, a raised portion of the ground in completely ill drained and marshy surroundings. This is now, as in most Indian towns, the centre of administrative buildings. Beyond the castle lies the arc of the 'Inner Wall' enclosing the older commercial centre famous in the days of the company and marked by the several wards-'chaklas'. Outside these older zone is the 'outer wall' enclosing the later extensions of the city. But in spite of its steady and at times declining population, the city has now grown out of its fortifications. Railway and industry have claimed the eastern interior and the west is marked by a suburban development of richer class bungalows all along the Estuary frontage, a development which will soon connect the city with its health resort, Dumas. The river is spanned by the Rander bridge, which being the only bridge, intensifies human activity along this route. Rander (pop. 14,500) though an older town, is now almost a satellite of Surat. An interesting side light in the regional geography of the Tapti Estuary is the changing importance of the two routes to Central India and Malwa. The Tapti valley route was the natural outlet to Khandesh produce before the railway era. With the construction of the B. B. C. I. route to Gujarat the trade was diverted to north and south through Ahmedabad and Bombay. The opening of the Tapti Valley Railway has again tended to restore the balance.

The upper reaches of the Tapti valley in Gujarat are dominated by the route centres of Bardoli and Mandvi. The region between Surat and Broach however is economically poor. The Satpura outliers underlain by the Trap encroach on the alluvial areas, and north of Tarkeshwar the land is much dissected by the rapid erosion of the Kim and her tributaries. It is not surprising therefore to find that their immediate banks are marked by an almost total absence of cultivation.

THE GULF COAST OF CAMBAY. The Gulf Coast Region has a geographical setting in which sandy belts and a greater rainfall than other parts of the plain are prominent. The level surface of the region has minor variations due to the deposition of marine nature. Sandy stretches are influenced by marine deposition and by river action. The

* G. A. B. Trivedi : 'Wealth of Gujarat'; p. 178. Surat is also the leading centre of handloom weaving industry in Gujarat having nearly 55,000 looms and a daily production worth Rs. 15,000. Telang : Handloom Weaving Industry in the Bombay Presidency, p. 21.

level bears an eroded and sandy appearance. Agricultural development is restricted owing to sandy, and swampy soils. Along the coast, mangrove vegetation prevails to a great degree. On less saline soils, loams containing an admixture of sand and alluvium, wheat cultivation finds a scope. Cotton to a certain extent is also grown.⁷ But the distinguishing feature in agricultural economy is the absence of rice in this tract whereas it is the major crop all along the coast to its south. This is due to the



FIG. 54.—Declining Ports of the Cambay Gulf.

rainfall. It is not however the agricultural production that supports the local population. In history the region has played a great commercial role. Ports of Broach, Cambay and their satellites were in a flourishing state in the Hindu and Muslim period.⁸ The trade of Northern India with the West passed through them. Under the Muslim

7. Crop production in the northern Gulf Coast region :

	Rice	Jowar	Wheat	Cotton	Total cultd. area	Total area
Waghra ..	400	32,000	25,000	105,000	223,000	335,000
Jambusar ..	3800	15,000	21,000	88,000	165,000	246,000

8. Broach and Cambay were well known as Bharukachcha and Stambhatirtha in the Early Hindu Period. Approaches to Broach even in the days of antiquity, as is mentioned in the Periplus, were not convenient. But during the Hindu period it was an emporium of trade for the entire Northern India. Altekar pp. 33, 34.

rule pilgrimage to Mecca attracted the attention of the Mogal rulers. Indeed so vital was their commercial role, that the English during their early ventures tried with success to negotiate trading facilities by placing a blockade on them. The economic prosperity of Gujarat depended on these ports and hence the Mughal Viceroy had to come to terms with the English. Broach had in those days a flourishing trade. Cambay was well known for its 'stones' and for its exports.

Anklesar and Hansot are minor ports. All these towns are now in a declining state because of the silting of the river mouths.⁹ It is only the geographical momentum that keeps their urban appearance; coasting trade continues and their economic function is restricted to exchange of commodities across the Gulf with Kathiawar.

The Central Plain

The alluvial region between the Coastal belt and the borderlands of the north east may be described as the Central Belt of Gujarat. This is the most fertile region of the Gujarat. Politically its major portion belongs to Baroda and along its north eastern borders are situated the other Indian States of the region. Broadly the railway from Mehsana to Wadhawan, and a line drawn from Nandod to Surat mark the north and south limits of the region. Towards the highland border the 200 ft. contour gives a good basis for demarcation. Coastwards its transition is gradual. Alluvium, flat surface dissected in many places by the streams, and moderate rainfall are the three main features of the region. The alluvial soil explains the high degree of land utilization. The rainfall distribution introduces a variation in crop production and gives a basis for distinguishing sub-regions.

THE BARODA REGION. This southern part of the Central Belt drained by the Narbada and Dhadar systems constitutes a fertile patch, owing to advantages of soil and greater rainfall. Cotton leads the agricultural economy. Broach and its improved varieties claim a major portion of the cultivated land. Rice and Jowar are subsidiary crops.¹⁰ The tract is less liable to famine than the Viramgam region in the north. Large and well featured villages reflect the agricultured prosperity of the Baroda plain. Commercial agriculture has naturally placed a greater emphasis on the nodal points of Dabhoi, Nandod and Baroda. Commerce attracts the population along the railway routes of which Baroda is the focus. Situated on the banks of the Vishwamitri river, Baroda (pop. 109,639)

9. Table II.

10. Table III.

was originally chosen as a fortified point on a raised portion commanding the surrounding lowland regions. Under the Gaikwads, it prospered as a seat of administration, commercial growth and nodality of communications in the Central Gujarat plain. Modern Industry has made its appearance and the city is recording a rapid expansion. Culture has

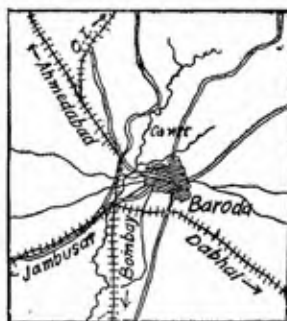


FIG. 54.—Baroda, the nodal centre of the Gujarat Plain.

followed in the wake of these new economic forces and the city now competes with Surat to dominate the life of Southern Gujarat.

CHAROTAR.¹ In the neighbourhood of the Mahi, the Baroda plain passes into what is probably the richest agricultural zone of Gujarat. This tract is famous as Charotar. It is a belt about fifty miles wide extending along the railway from Petlad to Nadiad between the Shedhi and Mahi rivers. This very rich alluvial and well watered tract, although liable to a great erosion along the Mahi valley, produces variety of crops. Cereals occupy 64.4% of the cultivable land, tobacco 10.8% oilseeds 40%. Garden crops are extensively raised.¹¹ Dairying is an important subsidiary industry. Environs of Anand are famous for it. The direct rail route to Bombay facilitates marketing of these products. Density of population itself is an eloquent index to the productivity of this region.

AHMEDABAD PLAIN. On the east and north of Charotar, the region merges into the Ahmadabad plain, which exhibits regional characteristics that are similar to those of the Baroda Plain. The farming and way of life in general are identical. Crop production is however slightly different. Crops like Bajri Jowar and Oilseeds are raised, but cotton does not monopolise agriculture as in south. Matar Umreth Mahuda and Kapadwanji

are the route centres. Ahmedabad evidently dominates the economic life of the whole region.

AHMEDABAD (pop. 599,000). Situated on the left bank of the Sabarmati, Ahmedabad easily influences all parts of Gujarat through its commerce and industry. The site, like that of Surat, was probably determined by the elevated position of the ground on which was built the original fortification. Its strategic value seems to have been determined by the fact that it was possibly the first fording point on the river from the eastern Gujarat to Kathiawar. South of it lay the ill drained area of the Cambay Coast. The fortified point received its first growth under the local Hindu chieftains during the 11th century, but the town reached its zenith of its prosperity during the Muslim rule, particularly as the seat of the Mogul Governors of Gujarat.¹² With the decline of the Mogal power, the city lost its tone, and its decline was further hastened by the blockades

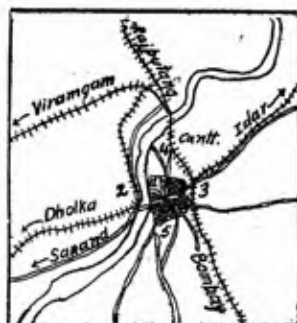


FIG. 55.—Ahmedabad.

1. Citadel. 2. Ellis Bridge and Sabarmati Extensions. 3. Asarva Saraspur Industrial Belt. 4. Shahibag 5. Southern Extension.

of the Gulf Ports by the Portuguese and other European powers during the 17th and 18th centuries. The Maratha rule reached Ahmedabad only to add further difficulties by way of civil strife and dyarchy over Gujarat. Only economic development of the last and the present century, particularly the growth of the Cotton Textile Industry, has enabled the town to revive its fortunes.

Yet, the difference between the glory of the past and the economic prosperity of the present is writ large on the face of this conurbation which is the second largest city in Bombay and sixth in India. Old fortifications, mosques, and monuments in ruins, strewn all over the city

12. Ahmedabad Gazetteer, p. 252.

and beyond it in what is now an agricultural zone, are the reminders of its historic past, while new buildings, suburbs and textile factories show the superimposition of modern influences on the city's cultural carpet. The original citadel—the Bhadra—is now a centre of administrative buildings and hence thinly populated. Beyond the citadel lies the old town enclosed by the fort wall. This is the crowded nucleus of the town where density has been further intensified by the characteristic community houses—the *pols*.¹³ Religion has, as in most Indian cities, played its role in the distribution, with the central areas dominated by the Jain section, the north-eastern and the south-western by an intermixture of Hindus and Muslims. In the old town economic status has hardly influenced the social grading of the inhabitants.

In its growth outside the wall, Ahmedabad has encroached upon the agricultural area and the surrounding villages. Cantonment to the north, the railway junction to its east, the Ellis Bridge, the Sabarmati Jail and its counterpart the Sabarmati Ashram, educational institutions and the textile factories have contributed to the steady expansion of the city. The richer class residential dwellings of Shahibag, along the northern water front of the river, have now connected the old town with its cantonment. The east is essentially a working class area marked by Asarva, Saraspur, Gomtipur villages, and the intermediate land occupied by Cotton Mills and the Railway Station. The southern suburbs, possibly because of poor natural drainage, is a continuation of the eastern locality.

The city has thrown its urban arm across the river at two points: the Ellis Bridge, and the Railway Bridge and ford, to its north. The suburban development receiving its first impetus in the Ellis Bridge area and the Jail area, has now not only connected these centres along the river frontage, but is almost closing upon Sarkhej village via the Ashram. Rich class dwellings and middle class housing societies mark the urban effort along this bank of the Sabarmati.

Whatever were the origins of the city, Ahmedabad now draws its main inspiration through Modern Industry and Finance. The population

13. "Each *pol*, or house group, has only one or at most two entrances, protected by a gateway closed at night as a safeguard against thieves. Inside is one main street, with crooked lanes branching on either side. Most vary in size from five or ten to fifty or sixty houses. One of them, the *Mánvi pol* in the Jamálpur division, is much larger than the rest and includes several smaller *pols*, with an area of about fifty acres and a population of 10,000 souls. *Pols* are almost entirely inhabited by Hindus, in some cases by a settlement of families belonging to one caste, and in others by families of several of the higher castes, Bráhmans, Váníás, Suthárs, and Kanbis. Most of the *pols* have been established and provided with a gateway, at the expense of some leading man whose name the *pol* in many cases bears, and whose family holds a position of respect as the heads of the *pol*. Each *pol* has generally its own watchman and its own sanitary arrangements. The Ahmedabad talent for combining is shown in the management of the *pol* affairs." Ahmedabad Gazetteer p. 294.

has doubled itself during the last twenty years.¹⁴ Nearly half of it depends on Industry. About 2 lakhs are engaged in the Cotton Textile Industry the success of which has not been an unmixed blessing on the city. It has brought wealth and prosperity to the city, but excessive crowding also has followed in its wake. Nevertheless it is to the credit of the city that this is the only agglomeration of the Province that recorded a steady expansion during the last fifty years, and, through it has reflected the wealth and culture of Gujarat, its economic ambitions and social aspirations.

VIRAMGAM COTTON ZONE. Of the several distinctive features of the north-western portion of the Gujarat Plain, cotton cultivation is the foremost. The Sabarmati river, the 500 ft. contour of the North Eastern Hills, Palanpur boundary, the Little Rann and the lowlands of the Bhal region broadly describe the boundaries of this cotton zone. Black soil and moderate rainfall favour extensive cotton cultivation.¹⁵ Nearly 50% of the cultivable area is under this crop. Agricultural productivity supports dense population in spite of the liability of the region to frequent famines. Viramgam and Mehsana are the route and commercial centres. Industrially the whole region has a subsidiary role to the city of Ahmedabad, because of cotton. That the region was historically a gateway to Gujarat and Kathiawar may be seen from the position of ancient capitals like Patan.¹⁶ In fact the growth of the early Gurjar chieftains in this region makes it a cultural centre of Gujarat. Patan with its antiquities although a town in decay stands as a monument of the Gurjar culture of the ancient and medieval times, from which Gujarat draws its cultural inspiration.

BORDERLANDS OF GUJARAT. The highland arc of the north-west enclosing the Gujarat plain stretches from Rajputana route of the B. B. C. I to the Narbada Rift. Administratively it includes the district of Panch-Mahals and Gujarat Agency States.¹⁷ On account of the geological and climatic differences there is great regional contrast between these highlands and the plain of Gujarat. A major part of this region is underlain by crystalline rocks. Harder rocks, mainly granite and in local areas sandstones, have withstood erosion. These have developed the hilly tracts of the Mahi and Rewa Kantastates. Towards the south and east the crystalline series is succeeded by the Deccan Trap and the topography

14. Table IV.

15. Agricultural production in Viramgam Taluka. (in acres)

Rice	Wheat	Jowar	Bajri	Oilseeds	Cotton	Total cult. area
400	3,600	89,000	40,000	6,600	170,000	323,000

16. Altekar p. 12.

17. Table 1.

changes accordingly. Intense erosion has made this region a land of alternating valleys and water partings. This topographical feature is more in evidence in the Sabarmati system of drainage. Greater rainfall and humidity than in Gujarat alluvial plain are the two well marked features of climate. Agricultural development is mainly restricted to valleys. A major portion of the hill tracts is under forest. It is mostly scrub type in the north, but improves towards south under the influence of a heavier rainfall.

From the economic point of view the region remains backward. It is thinly settled. Cultivation is of poorer type. Aboriginal agriculture prevails in the hill tracts. The only modern economic influence that percolates in these hills is the mineral development which has its best scope in the neighbourhood of Shivarajpur where a joint stock concern works the manganese deposits. Building stones are worked near Idar. There is also some scope in the exploitation of iron and other minerals. Indigenous handicrafts flourished, in many States, notably in Idar, but now as may be perhaps expected, these are in a decadent condition.

Though the region remains economically backward, its political geography and space relations bring out the regional significance of these borderlands. Historically these hilly tracts have acted as a buffer between the rich lands of Malwa and Gujarat. True to its highland character the region was dominated by local chieftains who used to transfer their allegiance to suit the balance of power between their powerful neighbours. The existence of the Mahi and Rewa States is an evidence of this political past. Next to political importance comes commerce. The routes from Malwa and Central India to Gujarat Ports pass through the gaps of this region. Trade followed the Ahmadnagar, Idar and Pol route to Rajputana, via the Lunawada route to Mewad, and the Godhra route to Malwa. In its present setting this commercial importance is emphasised by the railway route to Malwa and Rajputana. The distribution of population and growth of urban centres are therefore a complex of these two influences: defensible positions along the strategic routes, and commerce. Every valley route of importance is marked by two or three towns. Idar and Balasinor are typical fortifications that have grown into towns under the patronage of local rulers. Lunawada and Kandod are route and administrative centres. Ahmadnagar, Visnagar, Jhalod and Dohad are lesser route centres. How significant is the influence of railways on local economic conditions is seen through the changed fortunes of these different routes, and the towns that are situated along them. The older towns of Idar and Lunawada have now ceased to attract commerce, and prosperity adheres to the railway routes from Baroda to Central India, and from Ahmadnagar to Rajputana. Godhra (pop. 41,000) is a flourishing commercial centre on the C. I. route and forms an exception to the starggling towns of this highland belt.

THE PALANPUR GAP. Between the Aravali outliers of the Mahikantha States and the Rann of Cutch lies a lowland region underlain by alluvium with local 'drifts' of sand. This is administratively the Banas Kantha Agency. Regionally it may be suitably described as the Palanpur Gap. It owes its strategic and commercial importance to its position as a gateway to Gujarat from the north. In its early history this region was a much frequented route of the Muslim invaders from the Punjab. It became a commercial artery for Gujarat when products of the north found export through the Gujarat Ports. Local production is unimportant owing to poor soils and uncertain rainfall, although its livestock is famous for its quality. The region on the whole is thinly populated and contrary to the general expectation, transport developments have not attracted greater numbers. Palanpur and Radhanpur (pop. 15,000), originally fortified points, are local commercial centres, but are recording a decline. This must be explained with reference to the transit trade of the region. The old caravan routes from north gave these towns good economic support because these were then halting stations. Chandrawati is also mentioned as a famous commercial centre in the early Hindu records. Railways however have quickened the pace and the towns have no sufficient economic base to grow, as they have ceased to be the halting points. Volume of transit trade alone hardly offers an economic status to a locality. It is either a natural obstacle or the price of transport necessitating rest or change of animals that gives an encouragement to urban centres.

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5. Statistical Abstract: Baroda.
6. A. S. Altekar: History of Cities and Towns of Gujarat and Kathiawar.
7. Indian Census Reports; 1931; 1941.
8. Bulletins, Department of Industries; Bombay.
9. Bombay Minor Ports Committee Report (1939).

TABLE I

Gujarat.

	Area in sq. miles	Population	Density	Net cultd. area (in %)
British Districts :	...	10,389	4,192,713	...
Ahmedabad	...	3,899	1,963,438	354
Broach and Panch Mahals	...	3,198	924,527	290
Kaira	...	1,617	914,957	566
Surat	...	1,695	881,058	520
Gujarat States :	...	7,493	1,458,702	...
Balasinor	...	195	61,151	324
Banda	...	212	54,735	255
Baria	...	810	189,062	233
Cambay	...	392	96,562	247
Chota Udepur	...	894	162,177	137
Dharampur	...	719	123,326	175
Jawhar	...	308	65,126	211
Lunawada	...	419	105,318	271
Rajpipla	...	1,515	249,032	164
Sachin	...	49	26,231	452
Sant	...	390	94,257	239
Surgana	...	131	18,242	140
Dangs	...	667	40,498	61
Sankheda	...	338	76,167	225
Rest of Agency	...	454	96,738	213

TABLE II

Ports of the Cambay Gulf.

	1881	1901	1921	1931	1941
Dholera	...	10,301	7,356	3,491	3,657
Ankleshwar	...	9,535	10,225	11,762	12,025
Broach	...	37,281	42,896	42,648	34,276
Hansot	3,925	...	5,462
Jambusar	...	11,479	10,181	10,217	11,734
Bulsar	...	13,229	12,857	19,822	19,481
Rander	...	9,416	10,478	10,547	12,344
Surat	...	109,844	119,306	117,434	98,936
Bhavnagar	...	47,792	56,442	59,392	75,594

TABLE III
Agricultural Production.
(In Acres)

	Bajri	Kodra	Rice	Cotton	Tobacco	Jirn	Potatoes	Sugarcane
Nadiad ...	28,900	15,600	14,300	2,700	7,700	191	91	27
Anand ...	36,900	27,300	9,700	4,000	4,900	503	29	23
Borsad ...	22,000	21,500	5,600	3,100	9,800	131	3	42

TABLE IV

Ahmedabad and Surat : contrast in Urban growth.

POPULATION

		1881	1921	1931	1941
Ahmedabad	...	137,041	274,007	313,789	59,153
Surat	...	109,844	117,934	98,936	171,443

OCCUPATIONAL DISTRIBUTION*

	Agriculture	Industry	Transport	Trade	Public Admini- stration	Professions	Domestic Service
Ahmedabad	49	2955	155	575	93	180	48
Surat	44	380	67	239	15	74	29

* These figures relate to Principal earners only; 00 omitted.

POPULATION IN INDUSTRY

(00 omitted)

	Textiles	Wood	Chemical products	Food	Narco- tics	Metals	Dress etc.	Construc- tion	Electri- cal
Ahmedabad	1861	20	25	9	17	44	39	32	15
Surat	66	1	...	10	1	2	6	5	5

CHAPTER XI

Kathiawar Peninsula.

If there is one distinctive physiographical region in Western India, it is the Kathiawar Peninsula. Even here the transition from Gujarat region is not so abrupt as might be normally expected. The Peninsula has a length and breadth of 200 and 165 miles respectively, and an area of

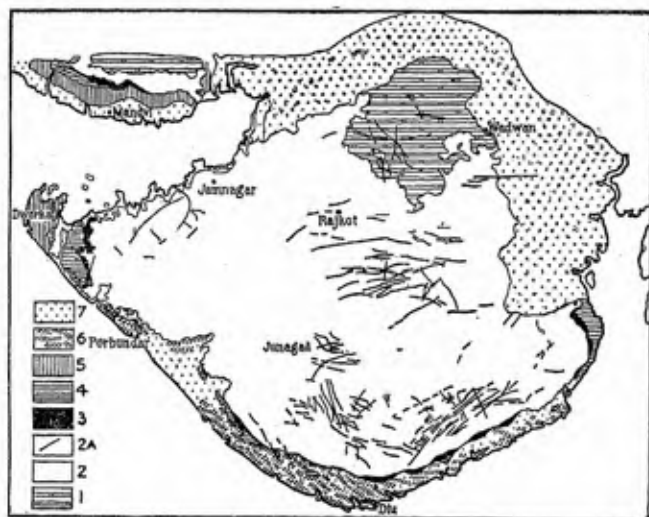


FIG. 56.— Geology of Kathiawar (after Fedden).

1. Uria beds. 2. Trap. 2A. Trap Dykes. 3. Laterite. 4. Gaj Beds. 5. Dwarka Beds.
6. Millolite. 7. Alluvium.

22,000 sq. miles.¹ Its relief features are explained by the geological history. The central region consists of a trap area where the more resistant granitic masses like the Girnar stand out prominently encircled by a girdle of lowlands.² Partly the relief is explained by volcanic effusions. The effect of relief is further heightened by intense erosion. Trap dykes introduce

1. Bombay Administration Report 1920.

2. Fedden ; Geology of Kathiawar : pp. 2, 20, 21.

immense local variation in topography. Not all the trap area however is highland. Erosion on softer series have developed lowland tracts like the regions of the Shetrunja valley in the south-east. To the north-west of this trapean core, lies the older formations of Umia series in Wadhwan and Dhrangdhra States, where the sandstone and allied types stand out as plateau forms slightly jutting out of the alluvial lowlands and bearing a dissected appearance owing to river erosion. The rest of the northern



FIG. 57.—Kathiawar: Relief.

1 Land between 300-600 ft. 2. Between 600-1500. 3. Between 1500-3000. 4. Over 4000.

lowland is underlain by recent deposits. More interesting is the geological layout of the south. The junction of the Trap and the overlying territories is marked by a line of laterite formations. The line is not continuous but locally it introduces sharp variation in landscape. The Dwarka and the Gaj Beds similarly introduce local differences in topography and land use along the southern coast.³ Seawards, alluvium circumscribes the peninsula. It is particularly extensive in Gohilwad and Jhalawad. Along the southern rim it is marked by the sub-aerial deposits of miliolite locally famous as

3. Adye. : Economic Geology of Porabandar State.

Porbandar stone. This geological variation explains the physical features of the peninsula, and the nature of the coastline. Erosion from the general granitic core has given it an almost radial pattern of drainage except in the Dwarka Foreland and Wadhwan region. The straight coast line particularly in the south is a complex result of a rising coast, and marine and riverine deposition.⁴ A shallow shore line, sand bars enclosing wide stretches of brackish marshy areas, are common features of landscape along the Kathiawar Coast.

From the point of view of climate, the Peninsula marks a transition from the regions of medium rainfall to those of drought. Temperature is of little consequence. It is equable all round the coast, and records some range in the interior. But the fundamental contrast is that in rainfall, and its distribution.⁵ From south-east to north-west it marks a steady decline except in the central hills where it is high. Variability increases towards the drier regions of the Halar Coast. This diversity in geological structure and climate accounts for the striking regional differences in the Peninsula.

THE GATEWAY OF KATHIAWAR. The land connection of the Kathiawar Peninsula is much restricted on account of its geological formation. It was separated from the mainland by an intervening stretch of a shallow sea.⁶ Later deposition connected these formations with the mainland. This process of deposition is far from being complete as is clear from the lowlands of the Little Rann and the 'Bhal'. The oldest of the Peninsular formations however present a narrow bridge to the Gujarat Plain.⁷ This is the region of Wadhwan and Dhrangdhra underlain by the rocks of the Umia series.⁸ This region stands out in contrast to the surrounding alluvial plain. On account of its higher elevation, differences in landscape, and its political history, this region may be truly called the gateway of Kathiawar. Broadly it forms a triangular shaped area almost coextensive with the Wadhwan sandstone and Umia formations. A line connecting Wadhwan, Dhrangdhra and Than, roughly defines this region. On either side of this slightly raised plateau are the lowland marshy areas which, in the past were handicaps to commercial and strategic routes. It is not surprising therefore to find that Wadhwan and Dhrangdhra, and what may be called its 'outlier' Patan, played a vital role in the stormy past of the Peninsula. Wadhwan (pop. 21,000) was a famous fortified town and finds mention as Wardman in the early Hindu Inscriptions.⁸ Its defence advantage on a strategic route and commanding position over the surrounding plain decided its site

4. Fedden : p. 54.

5. See above, p. 53 ff.

6. Kathiawar Gazetteer.

7. Fedden : p. 5 ff.

8. Altekar : p. 38.

and subsequent growth. Even after good many changes in its fortunes during the Muslim and Marathas, it retains its importance because of its position in relation to the Kathiawar commerce. Roads and railways have given further stimulus. A large element of population is dependent on the activities of the Civil Station, the Head-quarters of the Eastern Kathiwar Agency. Dhrangdhra (pop. 21,000) originally a fortified town is now a commercial centre of the cotton district. Its commercial prosperity has lead to industrial development. From the point of economic activities, it has therefore a greater importance than Wadhwan although its more northerly position is a handicap to its growth.

The commercial importance of this region is due to its position as a 'bottle neck'. Agricultural surroundings are rich and prosperous. The famous Dhrangdhra cotton finds a good market in Ahmedabad. Oilseeds are the second leading crop.⁹

GOHILWAD LOWLANDS. South of the sandstone Plateau, begins the lowland of Eastern Kathiawar locally known as the 'Bhal and Nal' tracts. From Wadhwan to Bhavnagar, the arc of the 60 ft. contour demarcates this region from the neighbouring-central highlands. It is an alluvial plain developed from the denuded materials of the highland belt of the centre and south. Drainage is parallel but sluggish. In fact the region is liable to extensive floods during the monsoons, and the influence of the saline waters nearer the coast makes the soils surface comparatively infertile. Towards the coast brackishness and sandy areas increase. On account of alluvial soils and favourable climate agriculture is the mainstay of the community. A diversity in crop production is possible.¹⁰ In northern region surrounding Dhanduka wheat is extensively grown. Density of population reflects agricultural productivity. Urban element is important. Nearly every town is either a port, or a commercial centre of the interior. In the pre-British days these were fortified and administrative points selected by local rulers. Wala or Valabhi (pop. 4,500) flourished as a seat of administration during the early Hindu rule.¹¹ Dholera (pop. 2,800) has a memorable past. Rising coastline and deposition have thrown these ports into disuse. The Bhavnagar Rail route and road development have forged a new bond between these ports and Ahmedabad. These towns accordingly look more towards the railways and the road than towards the Gulf to which they owed their early prosperity.

9. Production of major crops in Dhrangdhra state : (in acres).

Total area	Cultd.	Wheat	Jowar	Cotton	Oilseeds
1167 (sq. miles)	358,804	1687	72,800	173,890	4000

10. Crop production in the Gohilwad talukas :

	Rice	Wheat	Jowar	Bajri	Cotton	Net cultd.
Dholka ...	4,300	100,000	62,000	141,000	84,000	284,000
Dhanduka ...	..	744,000	124,000	36,000	118,000	406,000

11. Altekar, p. 39.

BHAVNAGAR. Among the declining ports of the Gulf of Camby, Bhavnagar (pop. 100,000) offers the only but an important exception. The town is of a recent origin. The Bhavnagar rulers transferred their capital from Sihor to the present site in 1723. Nearness to the Kalubhar creek and a good defensive position at the foothills of the Chandikani Dhari Hills determined its site. The underlying harder rock was an added advantage. During the subsequent years the town rapidly grew as a commercial centre of Kathiawar.¹² That has attracted Industry and Arts. Bhavnagar is now the premier town of the Peninsula as it enjoys certain advantages over other ports of the Gulf, in spite of the poor natural setting of its harbour. From the Arabian Sea it is the first port through



FIG. 57.— Site of Bhavnagar on the Kalubhar creek, indicated by the 100 ft. contour.

which cargo may be discharged for Rajputana and Northern India. Further up the Gulf and also on the eastern shore the coast is shallow and larger shipping cannot reach ports like Cambay. The ports of the Gulf of Cutch claim also a shorter distance, but the port facilities do not compare well with those of Bhavnagar. The immediate agricultural hinterland which exports cotton and oilseeds is another special advantage of the city. The general process of silting up which characterises ports of the Gulf is not intense. More-over the scouring action of the tides helps to keep free from extensive silt deposition. Recently harbour facilities have been improved by the State. This is expected to promote foreign trade. Already along with the other progressive ports of Kathiawar it has shared the general increase in foreign trade. It therefore stands in contrast with the decadent ports of the gulf like Surat and Broach situated just on the other side of the Gulf. Industrial development particularly in textiles has good scope.¹³ While Bhavnagar thus dominates the economic activities of the south-eastern Kathiawar, local and transit trade runs through minor nodal points like Limbdi, Dhanduka, Botak, Damnagar and Gadhada.

12. Administration Reports of the Bhavnagar state, 1939-40.

13. The city has already flourishing Cotton Textiles, Chemical, Match; and Fertilisers, industries to its credit. Adm. Report pp. 34-35.

THE SHETRUNJA BASIN. The Sihor and Palitana arms of the Southern Highland Belt separate the Gohilwad lowland from the Shetrunja Basin. This constitutes one of the best agricultural regions of Kathiawar. It has a fanlike extension in the upper reaches of the Shetrunja river owing to the pattern of the tributaries. At its eastern end however the basin has a constricted opening owing to the granite out-crop of the Palitana and Gir Ranges. At Vadai the river emerges out from what is practically a hilly area. Beyond this settlement, the main Basin is joined by the Palitana lowland. About 20 miles south-west of Vadai the river course partakes the regional characteristics of the southern coast. Politically the major area belongs to Baroda. Amreli (pop. 20,000) is the economic focus of the upper basin. Lilia is a minor commercial centre. Kundla is a gap town in south. A remarkable feature of the basin is its pattern of communications which runs across the valley and not along with it. This is because the state boundaries also run across the Basin. Bhavnagar for instance has constructed the Mahuva-Kundala railway and a road parallel to it which traverse the Basin in its central area. Palitana (pop. 18,000) the famous Jain centre is situated just outside the main basin. It is also a nodal pint. On the whole it may be said that the river Shetrunja does not bring about a complete economic unity over the basin.

THE BHADAR BASIN. The northern and western ends of the Gir Hills separate the Shetrunja and the Bhal drainage from that of the Bhadar and its complementary stream, the Ojat. The area drained by these streams forms the second leading agricultural region of Kathiawar. The Basin is almost in the shape of an arc with an opening to the sea. In the north and north-west the hill tracts of Gondal and Jetpur, and the Barda Hills separate this region from the northern coastlands. In the upper stretches the topography is undulating. South of Dhoraji the Trap has been worn to a wide plain in which the dioritic Trap of Girnar stands out boldly commanding the surrounding lowlands.¹⁴ The Felsitic trap of

14. "The Gírnár mountain is a majestic pile of diorite rock, with terrific scarps and precipices, propped by diverging buttresses, which, insculcating with the surrounding ridges, give rise to four distinct areas of drainage, each discharging through one of the four gorges in the outer ranges. This central pile which is far loftier than the surrounding ridges (save that to the south, whose highest point nearly rivals it), assumes somewhat the form of a huge cupola, laterally compressed, and is crowned by several sharply defined peaks of an extremely precipitous and picturesque character; the loftiest attains a height of 3,666 feet above sea-level.

The Gírnár appears to have been produced by a volcanic eruption of considerable magnitude towards the close of the Deccan-trap period; and the mountain, in its entirety, must have attained vast proportions in comparison with its present denuded appearance. The great central mass now represents so much of the core, or plug of the vent, the outer portion having been more readily removed by denudation, owing to the decomposition of the component minerals." Fedden, p. 21.

Osham is almost its minor replica. Similar composition of the Barda hills explains their formation and physical characteristics.¹⁵ The lowlands of the Basin are underlain by black soil derived from the Trap. Towards the coast, alluvial soils supercede it.¹⁶ Locally, topography and land use are much influenced by the outcrop of the trap dykes and the cover of milioite which are fairly extensive south of the Junagad town and the whole of the south-western portion of the basin.¹⁷ Jowar, Oilseeds and cotton are the leading crops.¹⁸ There is also a good proportion of area under irrigation and crops command a good market. Produce is exported to Ahmedabad and Bombay. Pattern of commercial centres has a close parallel that of the Shetrunja valley. Situated at the head of the Basin, Gondal (pop. 13,000) is a leading commercial centre famous for its cotton trade. To its south-west is Jetpur (pop. 28,000). It is a nodal point for roads and railways of the upper basin. Dhoraji (pop. 37,000) has a wide hinterland both in the doab of the Badad and Uben, and in the western part of basin, with which it is connected by a railway and a road via the Supedi Bridge. This

15. The Barda Group, like that of Girnar, was thrown up by the intense volcanic intrusions of the Deccan Trap Period. "The convulsions which gave birth to the enormous overflows of lava from gigantic fissures, resulted in the formation of the vast accumulation of bedded lavas with their subsidiary dykes, which today constitute the wide plains and ranges of hog backed hills of the country side....its later manifestations were limited to a few violent outbursts through foci of eruption, the wrecks of which persist in the form of groups of mountains and high hills, now familiar in our midst as Mount Girnar, the Alech and the Barda Hills....Upon the cessation of volcanic activity, a prolonged period of severe denudation must have naturally followed to devastate the gigantic mountains to their very base, so as to lay bare their hypabyssal cores; while simultaneous and subsequent earth movements, of the nature of gradual subsidences and elevations of the land must have supervened, to account for the present physiographical features of the country side." Adye, p. 14.

16. Fedden, p. 54.

17. "The effect of a dyke, on the sedimentary beds traversed, is generally to indurate, and at times to blacken or to bleach the rock for a short way on either side, and the hardened portion, being better able to resist denudation, often remains as a narrow craggy ridge along the course of the dyke....Some of these basaltic dykes, having resisted the denuding agencies more effectually than the neighbouring rocks, stand up like the ruins of a great boundary wall across the country." Fedden p. 32.

Fedden proceeds to point out the influence of these dykes on human activities: "It was observed that the agriculturists persistently sink their irrigation wells along the dykes, tracing out their course with great assiduity, they are almost invariably rewarded by the wells yielding water at depth within 15 to 20 ft. of the surface." p. 33.

Influence of the dykes on land use, size of holdings and settlements, would be a very fruitful source for a detailed regional investigation.

18. Major crops of the Junagad State :

Total area	Cultivated	Cotton	Jowar	Bajri	Oilseeds
1,046,000	414,000	152,000	70,700	203,000	160,000

western hinterland is in no small measure due to its monopolistic position for no railway or major road crosses the river except at this point throughout the course of the river. The western Bhadar Basin is further subdivided into two parts by the low range of the Alech Hills. Upleta and Bhayavadar are its minor commercial centres connected with the outer zone by the porbandar and Gondal Railway. Drafa is a route centre in the northern Barda Hills. In the southern zone of the Basin lies Kutiyana (pop. 18,000) on the banks of the Bhadar. In the eastern lowlands drained by the Uben and Ojat, Sarsia and Visavadar are route centres for the Western Gir Ranges. These are connected by railway to Junagad. Almost at the confluence of the Uben and Ojat lies Vanthali-Vamansthal of the Puranas—which was once a seat of Hindu Rulers.¹⁹ The commercial town of Bantva (pop. 14,000) is situated in the centre of the lower Bhadar and Ojat Valleys. It has a rich agricultural setting. The major town of the Basin however is Junagad (pop. 57,000) a settlement of great antiquity. Its site was selected by the early Hindu Rulers owing to the advantage of defence. It has a commanding position over the Basin, and the flourishing ports of Sudampur Manglur and Patan. In spite of the commercial development of the Peninsula it has not lost its administrative importance, since the major portion of the Basin belongs to the Junagad State. Like all other ancient towns, the 'old core' remains distinct, but with the increasing advantages of security, law and order, the town is descending on the plains leaving the original walled site.

THE SOUTHERN COAST. The coastlands of the southern Kathiwar stand out as a distinct geographical region on account of its geological structure and economic development. Its limits are fairly distinct. It is a belt twenty miles wide extending from Bhavnagar to Mode Creek, and mainly bordered by the Gir Ranges and the Barda Hills. Its western limit is set by the Dwarka Beds which outcrop beyond the Mode Creek. It is along the Bhadar Basin that the line of demarcation is indistinct. Alluvium characterises nearly the entire surface. But an immense variation is introduced by the outcrop of the older rocks, laterite, the Gaj beds and Miliolite.²⁰ From Bhavnagar to Gopnath point the belt is underlain by the post-Trappean Gaj Beds. These are separated from the Traps by a low running chain of laterite which bear a resemblance to the 'high level'

19. Altekar, p. 41.

20. The Gaj and the Dwarka beds owe their origin and distribution in the subsidence and elevation of the coastal fringes. Geographically, they lend a distinctive shape to landscape both in its colour and economic use. Commercially, they are important as building and ornamental stones, colour and as raw materials in the cement industry. Adye, pp. 14, 42, 44.

laterites of the Sahyadries.²¹ Because of its poverty in soils, the laterite offers a regional contrast in vegetation and landscape.

The Ghoga Plain is a rich agricultural region. Clayey outcrops yield good soil, but local areas of gaily conglomerate and sandstone are obviously poor.²² Most of these low hills, as the one near Hathab, are given for rough pasture. The coast line is regular and much sub-aerial deposition is in evidence. In the oceanic trade of the early Hindu Rulers, Hathab and Ghoga were flourishing ports. The southern end of this sub-region is marked by transition in two ways. Alluvium of the Shetrunja mouth succeeds the Tertiary rocks, and from the Gopnath point the smooth coastline changes to one marked by alternating headlands mainly consisting of miliolite, and bays. The alluvial stretches are well worked and a diverse crop production is possible. But laterite and the distribution of milolite curtail agricultural production to a great extent. Along the coast line sandy soils promote plantations of casurina and cocoanut. Salt marshes of Pipavav Ranai and Diu effect a change in scenery. Population is mainly agricultural but coastal fisheries and ports support a good percentage. Mahuva (pop. 22,000) is the leading port of the sub-region. It is a growing town of the Bhavnagar State with an export trade of cotton to Bombay. Harbour facilities have been recently improved, but it remains to be seen whether the port will continue to grow in future now that it has been connected with Bhavnagar by a railway. It is possible that the export trade may be diverted to the major port of Bhavnagar.

West of the Diu headland the coastline resumes smoother north-westward curve. Geologically the belt from Diu to Mode Creek is a continuation of the Gopnath-Diu tract with its characteristic Laterite Gaj and Miliolite outcrops. These lend a good variety to the landscape and to its utilization all along the coastal belt from the Diu Island to the Dwarka Foreland. Miliolite however is more extensive in the Bhadar Basin and earns the name of Porbandar stone for its ease in

21. "In the western division of the province, however, where the trappean floor is nearly horizontal, some large spreads of the lateritic rocks occur along the border between the traps and tertiaries; also as outlying patches resting on the former, and as inliers well within the area of the latter formation. These inliers are in the form of hillocks, crags, and bluffs rising over the plain, having resisted the denudation prior to the deposition of the tertiary beds that surrounded them."

The lateritic rocks in Kathiawar closely resemble in many respects those in the neighbouring provinces of Cutch and Gujarat, and are to all appearances identical with the 'high-level laterite' and its associates of Peninsular India. They are generally unstratified, richly coloured, mottled, or white; the more lateritic bands are frequently strongly ferruginous, developing into red hematite." Fedden; p. 34. Also Adye, p. 41.

22. Fedden, p. 38.

cutting and subsequent hardening on exposure.²³ The most significant feature of topography is the wide extension of flat marshy areas at the mouth of the Bhadar and Ojat rivers. Their estuarine waters are blocked up by sand bars and raised beaches. Flood waters therefore spread out over the surroundings. At high tides there is an incursion of sea which renders the lower tracts of the estuary brackish and salt impregnated. But the fresh flood waters in the upper tracts are more than a compensation. These sweet water lands—locally famous as 'Gher'—are highly productive of rice, jowar, cotton, pulses and wheat.²⁴ Within a short stretch therefore a striking contrast is introduced. The poor sandy coastline marked by a string of settlements and a road connecting them, is succeeded by a marshy interior where vegetation is that of a swampy type and characterised by wild life. This belt in its turn is succeeded by the rich Gher lands.

Outside the Gher, the region partakes the general features of the southern coastal belt. Dry crops find an increasing favour due to lesser rainfall. Cultural landscape however is far more important. Situated on the Harna Creek are the twin towns of Veraval and Patan separated from each other by a short distance. Patan (pop. 11,000) is the famous religious centre where the Somnath shrine attracts Hindu devotees from all parts of the country. In the Hindu Period it was a famous city. Veraval (pop. 30,000) had commercial and religious importance. Its trade extended to Persian Gulf, East Africa and Peninsular India. In the interior it was connected with Junagad, and by a coast route to Ahmedabad. During recent times, however, its trade has declined with the growth of modern navigation. Recently its harbour facilities have been improved by the State authorities and now along with other Kathiawar ports Veraval claims a good share in the foreign trade of the Peninsula.²⁵ At the other end of the coastal belt is situated Porbandar. It was once famous as Sudamapur. Like Veraval it had a decline after the rule of the Hindu Kings. It is now a modernised town but a sand bar across the creek still reduces its utility. Further, it loses much of its advantage between the ports of the Gulf of Cutch and Bhavnagar.

23. "Milliolite forms the bluffs and cliffs on the south-eastern coast, and extends some way inland, sheeting the surface of the country. In many places it overlaps the tertiary rocks, and is seen to rest upon the laterite and trap. In the eastern part of the alluvial area, it is seen only near the coast; while to the westward, the whole country is encrusted with the rock. The streams in this ground have cut through it, forming small 'cañons' that are often impassable for many miles." Fedden, p. 54.

Commercial qualities of the Porbandar stone are well known. Adatiana Heights is now the busy centre of this industry exporting stone to Bombay and other cities of India. Adye gives details of the composition of Milliolite. pp. 47-52.

24. Fedden, p. 54.

25. Table III.

The Northern Coast

The northern coastal zone of Kathiawar has distinctive features of its own, because of its orientation towards the Gulf of Cutch and the drier climate prevailing. The region extends from the Dwarka Foreland to the Jhalawad outskirts in the Dhrangdhra state. It is abutted, for the major part, by the central hill tracts of Barda, Rajkot and Than. On the whole the region has an extension of about 150 miles. Within it, local variation due to the composition of underlying rocks affords a further sub-division from the point of view of regional studies.

THE DWARKA FORELAND. The tip of the Kathiawar Peninsula is important in many ways. Physically it is almost separated from the mainland by the marshy creek of Madhi. The underlying Dwarka beds give it a distinctive topography. Light coloured clays and limestones yield a different scene than the one derived from the Traps. Lowlands are underlain by clays and marls while limestones with their better resistance to erosion constitute the higher areas. Light soils and thin vegetation cover give the Foreland its characteristically dry appearance. This is further strengthened by the scanty rainfall. Agricultural production was never a strong point of the region.²⁶ During the Muslim and Maratha rule this semi-island tract was inhabited by the Vaghela tribes. Only the religious centre of Dwaravati or Dwarka rendered the whole region famous. But now Dwarka is a minor port. Its shrine attracts a great number of devotees to the place. Recently a new economic force is asserting itself in the shape of modern industry and commerce.²⁷ The Bayt has safe anchorage during the monsoons. The Baroda state to which belongs this part of the Peninsula is already developing the Port. A beginning in industrial development has been made by the Tata Chemical Industry. Salt deposits and limestone, and the harbour are its assets. Landwards the railway connection to Nawa nagar and Wadhwan has brought the region closer to its markets. The region commercially is full of promise.

THE NAWANAGAR COASTLANDS. East of the Madhi creed there begins the coastal tract drained by a system of parallel flowing rivers. It

26. Land Utilization in Okha Mandal : (in acres)

Total area	Forests	Not available for cultn.	Culturable waste	Net cultd.	Jowar	Bajri
156,000	13,000	21,000	72,000	49,000	13,000	35,000

Apart from Jowar and Bajri, no other crop of importance is produced. Baroda Statistical Returns, 1939-40.

27. Cement, Chemicals and Salt industries have already recorded good progress in the Okha Mandal region. Kapasi : Industrial progress in the Baroda State, p. 17.

is what Fedden terms a rock plain consisting of bedded Trap mostly decomposed and crumbling. The soils are good but scanty and uncertain rainfall is a limiting factor. Vegetation holds out a dry and scrubby appearance. In regions of poorer soils and higher elevation grassland areas are extensive. Millets and oilseeds are the major crops of the cultivated zone, but of greater importance is the livestock reared on grasslands and marshy vegetation especially asses and camels.²⁸ Agricultural community of the Halar is however poor. Their economic condition is well reflected in the poverty stricken hamlets of the zone. An appreciable percentage of the population is nomadic and depends on pastoral activities. Towards the Gulf of Cutch landscape changes considerably, for the coastline is fringed by a belt of marshy extensions. This is due to the rising nature of the coast and sub-serial deposition. This zone of marshy areas is mostly waterlogged with patches on higher levels which present a dry aspect. Isolation and swampy vegetation attracts wild life. Kanubhar and other islands that fringe the coast are the outliers of this coastal belt of recent alluvium.

Historically, the Halar Coast did not much attract human life except for some roving tribes and fugitives. The northern route from Halwad to Nawanagar was frequented by invaders, but the ports as such were never so important as those of the Sorath coast. The far off position of the Gulf of Cutch from the agricultural hinterland seems to be the main cause. The encircling Little Rann also imposed a great handicap on the growth of the ports. The limited trade of the Gulf was under these circumstances monopolised by Mandvi. Modern communications and increasing aid from the State authorities have now stimulated the growth of many ports in north Kathiawar. Bedi is being intensively developed by Nawanagar.²⁹ Morvi is concentrating on its sea outlet Port Navalakhi. The shorter distance of Red Sea and Suez, low transshipment costs and harbour charges, and favourable position in relation to Northern India, have enabled these ports to compete successfully with Bombay.³⁰ Although harbour facilities are not ideal, increasing state support and an agreement with the Government of India would encourage the development of these ports. Element of urbanisation on the Halar Coast is not so

28. "Extensive rock plains are a peculiar feature in the Western parts of Kathiawar, more particularly in the Dhrol and the Nawanagar States. The rock of these parts is a bedded part, mostly decomposed and crumbling. Yet the surface is almost as level as that of an alluvial plain. The planing down of such material could not have been affected by sub-aerial denudation, and I conclude, could only have been produced by a gradually encroaching sea." Fedden, p. 56.

29. Agricultural production of the Nawanagar State :

Total area	Cultd.	Jowar	Bajri	Cotton	Groundnut	Wheat
2,040,000	889,000	296,000	316,000	34,900	135,000	17,000

30. Tiwari : Kathiawar Ports, Bombay University Journal.

vigorous as in Southern Kathiawar. Jamnagar (pop. 71,000) is the chief commercial centre. Its site on the left bank of the Rangamati was selected for fortification by one of the early Jam Rulers after their migration from Cutch. Of the many industries for which it was so famous that of dyeing was the foremost. It claimed its fame on the chemical qualities of the river water.³¹ The industry is even now thriving. In addition to its commercial functions, Nawanagar has a large transit trade from Okha to Gujarat. In the new setting of the Halar coast, Nawanagar promises to be a greater agglomeration in future. Industrialisation of the surroundings and the growth of the Bedi Port are its assets. The lesser towns, Dhrol Wankaner and Morvi are route centres, where commerce is promoting industries like Potteries and Chemicals. An interesting feature of the urban geography is the almost complete absence of towns along the Halar coastline. It is likely that their growth has been arrested by their powerful neighbours of the interior, with which they are connected by rail and road. This is particularly true of Bedi. Nawanagar will probably absorb the port by a process of 'ribbon' development. Equally important is it to remember that such urban growth may be arrested by limitations of building space in marshy tracts. The present North Kathiawar Ports at any rate are mere wharfs and it probably pays better to 'depot' the goods in the parent town and use the ports for transshipment purposes only.

MORVI DHRANGDHRA COTTON ZONE.³² The undulating plain between the Machchu and Unai rivers marks a transition between the dry Halar Coastlands and the rich agricultural plains of Gujarat. Its southern portion is underlain by the softer sandstones and argillaceous shales of the Umia series. Towards the Rann, Umia Beds are succeeded by beds of older and recent alluvium. The southern limit of the region is indicated by the sandstone hills of Chotilla Region. From the agricultural point of view the difference in rock outcrops is hardly of major importance except in the colour of the soil. Cotton is extensively grown because of the fertility of the soils and a greater rainfall. The crop finds a large market through Halwad. In quality it is well known as the Dhrangdhra Cotton and commands a wide market in spite of its shorter staple. The close vicinity of the Rann encourages livestock industry and industrial development in the shape of a factory at Kuda, which is already working, and leather industry may be expected in future.

THE CENTRAL AND SOUTHERN HIGHLANDS. The hilly regions of the Central zone of Kathiawar have two features of geographical interest.

31. Kathiawar Gazetteer.

32. This is a region which marks a transition between the Halar Coastlands and Wadhwan Sandstone Region.

They offer a natural demarcation to the lowlands of the Peninsula. Secondly, there is a great contrast in vegetation and landscape. Varied geological structure affords a further basis for sub-division. Landscape varies according to the outcrop of the Umia beds and Trap rocks, although trap dykes tend to obliterate the differences. In the north-east, erosion has uncovered the Umia beds. The harder sandstones develop hill features like the ranges of Than. The area underlain by Wadhwan Sandstone has also similar features. Within the Umia beds there are local Trap outliers like the Wadhwan Hills. The Trap region of the centre enclosing the area of Rajkot, Chotila, Jasdan and Gondal, is more like a dissected plateau. The relief is broken by numerous dykes. Volcanic effusions are particularly prominent in the southern and western zones and give rise to the Girnar and other ranges. The dioritic outcrop of the Girnar is very prominent in the Bhadar Basin owing to its steep and intensely dissected flanks. To its east are the Gir Ranges which send out, from a common platform, two arms to enclose the Shetrunja Basin. The southern range has a greater elevation. It occupies a larger area. Intense erosion particularly on its southern flank explains its rugged appearance. The Palitana Range and its minor member the Sihor Range do not offer such dimensions, nor are they such effective barriers to human movement.

✓To the west of the Girnar, lies the isolated Osham Hill which is geologically a detached portion of the Bardas which mark the western most extension of the hill regions of Kathiawar. Forming an arc, these enclose the Bhadar Basin from the west. Erosion has probably broken the chain in the region of Bhanwad. Alech Hills are the extension of the northern member towards the Bhadar Basin.

✓The Gir Ranges with their greater rainfall have a more luxuriant growth of vegetation. ✓Its grasslands support the well known Gir breed of cattle. In the northern and the Barda Hills scrubby vegetation prevails. Livestock rearing therefore finds great scope. In spite of these local variations in relief and vegetation, the central and southern hill tracts of Kathiawar may be grouped in one region because from the human point of view their importance is almost the same all over. ✓A varied landscape, luxuriant vegetation and livestock rearing are the leading features of regional geography of the Central and Southern Hills. Historically these hills have played a vital role through the fortified points and strategic routes. ✓Every route of importance traversing these regions controlled a gap and almost every strategic point of importance became a town. Muli, Salaya and Jasdan belong to this category. Rajkot (pop. 51,000) originally had a similar setting as a defensible point west of the Aji river. From the administrative point of view, it is now the premier town of the Peninsula as head quarters of the W. I States Agency. In size it ranks first if the population of the Civil Station is included. But its economic functions

are hardly commensurate with its size. It claims certain indigenous industries. But placed as it is between Nawanagar and Gondal its commercial functions do not find a scope. Administration therefore is the main factor in its growth.

CUTCH: THE TRANSITION TO THE ARID NORTH-WEST. Cutch with an area of 8250 sq. miles and a population of 500,000 marks a transition between the wetter regions of Western India and the desert of Thar. From the point of view of relief it is almost entirely isolated from the mainland by the surrounding Rann which in spite of drying up during summer continues to be an effective barrier to human contact. The Cutch proper is almost a crescent shaped region bounded by the Gulf on the south and by the stretches of sandy deposits and swamps on the other three sides. Its geology explains its major relief features. While the Jurassic rocks lend variety and colour to the landscape, stratified and intrusive traps develop the hills of the Cutch proper and its three northern islands. Recent alluvial deposits have, particularly in the south-east, developed good agricultural belts. The drainage pattern is marked by a central watershed from which flow the major streams northwards to the Rann and southwards to the Gulf. But in spite of the geological variations and drainage patterns the landscape is dominated by arid conditions which have produced a much dissected surface all over the region. Human geography accordingly is rigidly controlled by soils, aridity and ease in communications. The alluvial soil belt lying almost midway between Bhuj and the south-east coast is the only agricultural region of some importance producing, largely on irrigation, wheat and cotton. In other parts of Cutch, agriculture is restricted to areas of irrigation, but the chief human occupation here is sheep and camel rearing on rough grasslands. This explains the population density of Cutch which is as low as 69 persons per sq. mile. It also accounts for the small element in urbanisation. Commerce has attracted people ever since the ancient times. Mandvi, Mundra, and Anjar, with its port Tuna, mark the human importance of the coastline both in the present as well as in the past. These are the commercial centres of Cutch and they throw back their influence in the arid interior along the roads and camel tracks. Mandvi (pop. 27,000) is the leading port. But Anjar also claims a share in the trade due to its nearness to Kathiawar and Gujarat agricultural regions, and the railway connection to the capital. In the interior human interest follows the lines of communications along which are situated the isolated and walled villages, of which Bhuj (pop. 25,000) has risen to the status of a town originally due to its strategic advantage, but now to its administrative importance.

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TABLE I

Major States of Kathiawar : Population and Area.

	Population	Density	Area	Percentage of Cultd. area
Bhavnagar	... 618,000	209	2961	65
Dhrangadhra	... 94,000	82	1167	46
Dhrol	... 33,000	119	283	*
Gondal	... 244,000	239	1024	53
Jafrabad	... 13,000	261	33	56
Junagadh	... 670,000	204	3337	44
Limbi	... 44,000	128	341	49
Morvi	... *	163	822	53
Navanagar	... 504,000	132	3791	*
Palitana	... 76,000	265	309	63
Porbandar	... 146,000	231	642	53
Rajkot	... 102,000	372	282	61
Wankaner	... 54,000	141	417	64
Wadhwan	... 50,000	216	242	37

* Not available.

For details of land utilization, see tables at the end of this chapter on Agricultural Regions.

TABLE II

Towns of Kathiawar

BHAVNAGAR 102,000; Botad 15,000; Gadhada 6,000; Mahuva 21,000; Rajula 7,000; Savar Khandla 17,000; Sihor 11,000; Jafrabad 6,000. GONDAL 30,000; Dhoraji 37,000; Upleta 16,000; Bhayavdar 8,000. JUNAGADH 58,000; Veraval 30,000; Kutiyana 18,000; Vanthali 11,000; Mangrol 18,000; Una 9,000; Patan 10,000; Keshod 8,000; Chorwad 6,000; Limbi 13,000. MORVI 36,000. JAMNAGAR 71,000; Khambalia 12,000; Jodiya 8,000. PALITANA 18,000. PORBANDAR 48,000; Ranawas 7,000. RAJKOT 70,000. WADHWAN 21,000. DHRANGADRA 21,000; Halwad 7,000. WANKANER 17,000; Lakhtar 6,000; Chuda 80,000; Lathi 6,000; Muli 5,000; Bagasara 9,000; Bantwa 18,000; Jasdan 7,000; Jetpur 28,000; Manavdar 8,000; Vaswad 5700.

PART III
ECONOMIC AND ADMINISTRATIVE



Fig. 58. Administrative Units of Western India.

Administrative Units of Western India

BOMBAY DISTRICTS

- N. Kanara*: 1. Karwar, 2. Ankola, 3. Kumta, 4. Henawar, 5. Bhatkal, 6. Supa, 7. Haliyal, 8. Yellapur, 9. Sirsi, 10. Siddapur, 11. Mundgod.
- Dharwar*: 1. Dharwar, 2. Kalghatgi, 3. Hubli, 4. Shiggaon, 5. Hangal, 6. Haveri, 7. Kod, 8. Ranebennur, 9. Navalgund, 10. Ron, 11. Gadag, 12. Mundargi, 13. Nargund.
- Belgaum*: 1. Belgaum, 2. Chandgad, 3. Khanapur, 4. Chikodi, 5. Hukkeri, 6. Bailhongal, 7. Athani, 8. Gokak, 9. Saundatti, 10. Murgod.
- Bijapur*: 1. Bijapur, 2. Indi, 3. Sindgi, 4. Bagewadi, 5. Bilgi, 6. Bagalkot, 7. Badami, 8. Muddebihal, 9. Hungund.
- Satara*: 1. Javli, 2. Patan, 3. Valva, 4. Shirala, 5. Satara, 6. Koregaon, 7. Man, 8. Khanapur, 9. Sasgaon, 10. Khatav, 11. Karad, 12. Wal.
- Sholapur*: 1. Malsiras, 2. Karmala, 3. Madha, 4. Pandharpur, 5. Sangola, 6. Sholapur, 7. Barsi.
- Poona*: 1. Mulshi, 2. *Bhor State*, 3. Haveli, 4. Purandhar, 5. Baramati, 6. Indapur, 7. Maval, 8. Khed, 9. Sirur, 10. Dhond.
- Ahmadnagar*: 1. Akola, 2. Sangamner, 3. Rahuri, 4. Parner, 5. Ahmadnagar, 6. Shrigonda, 7. Kopergaon, 8. Newasa, 9. Shevgaon, 10. Jamkhed, 11. Karjat.
- Nasik*: 1. Peint, 2. Dindori, 3. Kalvan, 4. Satana, 5. Malegaon, 6. Nandgaon, 7. Yeola, 8. Chander, 9. Niphad, 10. Sinor, 11. Igatpuri, 12. Nasik.
- E. Khandesh*: 1. Chopda, 2. Yaval, 3. Raver, 4. Amalner, 5. Parola, 6. Erandol, 7. Jalgaon, 8. Bhusaval, 9. Edlabad, 10. Pachora, 11. Jamner, 12. Chalisgaon, 13. Bhadgaon.
- W. Khandesh*: 1. Taloda, 2. Shahada, 3. Shirpur, 4. Nandurbar, 5. Sindkhed, 6. Navapur, 7. Sakri, 8. Dhulia.
- Ratnagiri*: 1. Mandangad, 2. Dapoli, 3. Guhagar, 4. Ratnagiri, 5. Rajapur, 6. Devgad, 7. Malvan, 8. Khed, 9. Chiplun, 10. Sangameshwar.
- Kolaba*: 1. Panvel, 2. Pen, 3. Alibag, 4. Roha, 5. Mahad, 6. Mangaon, 7. Karjat.
- Thana*: 1. Dahana, 2. Mahim, 3. Bassein, 4. Salsette, 5. Vada, 6. Shahapur, 7. Bhiwandi, 8. Kalyan, 9. Murbad.
- Surat*: 1. Oipad, 2. Chorasi, 3. Mandvi, 4. Bardoli, 5. Valod, 6. Jalapur, 7. Chikhli, 8. Balsar, 9. Pardi.
- Broach*: 1. Hansot, 2. Vagra, 3. Broach, 4. Jambusar, 5. Amod, 6. Anksleshwar.
- Kaira*: 1. Matar, 2. Mehmabad Nadiad, 3. Kapadwan, 4. Thakra, 5. Anand, 6. Borsad.
- Panch-Mahals*: 1. Godhra, 2. Kalol, 3. Halol, 4. Jhalod, 5. Dohad.
- Ahmedabad*: 1. Sanand, 2. Viramgam, 3. Dholera Dhanduka, 4. Daskrol, 5. Prantij, Modasa.

MAJOR STATES AREAS (marked off by thicker lines)

- Deccan*: 1. Jawhar, 2. Janjira, 3. Phaltan, 4. Aundh, 5. Jath, 6. Jamkhandi, 7. Muchol, 8. Sawantwadi, 9. S. M. C. group.
- Gujarat*: 1. Baroda, 2. Palanpur, 3. Idar group, 4. Lunawada, 5. Rewa Kantha group, 6. Rajappla.
- Kathiawar* (Major boundaries): 1. Nawanagar, 2. Porbandar, 3. Gondal, 4. Amreli, 5. Junagad, 6. Bhavnagar, 7. Jasdan group, 8. Rajkot, 9. Dhrangadhra, 10. Wadhwa group, 11. Wankaner, 12. Morvi.

CHAPTER XII

Agricultural Regions of Western India

GENERAL CHARACTERISTICS. The post-war period has shown that agriculture is increasingly playing an important role in the economic destinies of the human race. ✓European nations, particularly Great Britain, have realised the vital role of agriculture in the national economy, and the British are already planning for agriculture in spite of their industrial and commercial specialisation.¹ Stapledon and Russell have brought English Agriculture almost to the efficiency of industry. ✓The British Nation is looking upon agriculture not as a source of subsistence during war, but as a factor which gives stability to a nation both in terms of economic as well as social welfare. This aspect therefore deserves an even closer consideration in the planning of Indian Economy.

How important is the role of agriculture in the human geography of Western India, can be well discerned from an initial survey of its characteristics, the extent of land use and the dependence of man on the soil. Out of an area of nearly 76143 sq. miles, about 53% is under cultivation, 11% under forest, 7% cultivable waste, and 22% not available for cultivation which largely includes waste land.² In terms of the human element, over 70% of the population is dependent on agriculture. Density of population is 230 per sq. mile. Agricultural operations are essentially of a *jirayat* character, 7% being under irrigation. ✓About 70% of the gross cropped area is devoted to food crops and 30% non-food crops. The pressure of population on the soil is gauged from the figures relating to the area of cultivated land per head of population, which ranges from 0.14 acre in the Ratnagiri district to 3.42 in Bijapur. The average 1.53 acres for the Bombay Province must be considered as very low because of its poor quality in contrast to the position of land in Europe and America.³ The influence of land tenures which are historical gifts, fragmentation, soil erosion, poor live stock,

1. "The land is almost the only physical thing that goes on, century after century; and the farmers in Britain have had to face not very different problems in managing soil, plants and animals four thousand years without a break." Easterbrook: *The Future of Agriculture*.

2. The percentages relate to the figure of Bombay Province, as it was impossible to obtain the data of all the States. For individual States, see Table I, and also tables in Chapter I, Part I. Also Census of India, 1941; Bombay p. 8.

3. U. S. A 3.5 acres; France: 1.5 acres.

poor physique of the rural population, its ignorance, and economic handicaps complete the picture of human element in agriculture.

CLIMATIC ENVIRONMENT. Although certain generalisation regarding the unsatisfactory state of Indian Agriculture could be safely made, it is now necessary to take a regional and quantitative view, an aspect which is liable to be often overlooked by administrators and economists. A regional survey shows that conditions are not uniform all over the Western India,



Fig. 59—Regional Crop-production.

J. Jowar; B. Bajra; R. Rice; W. Wheat; O. Oilseeds; C. Cotton.

nor is it scientific to accept the 'district' figures as has been hitherto done by our administrators by referring to the Statistical Atlases arising out of the Famine Code. Agriculture is the creation of cultural landscape by man. It presents all the features of variety and detail as shaped out by the geographical environment. Climate evidently has influenced the agricultural pattern of Western India. The amount of annual rainfall determines the distribution of crops, particularly of rice, millets, wheat and cotton. The length of the rainy season influences agricultural practice and crop rotation as in N. Kanara where rice is double cropped, and to

the other extreme in Northern Kathiawar where hardy crops are raised in the short rainy season, amidst a grassland environment. Late summer and winter rains promote rabi agriculture on the eastern margins. Variability of the monsoon is probably the greatest factor affecting the



Fig. 60—Jowar. 1 dot : 1000 acres.

(Intervening blanks in this and subsequent distribution maps are State areas.)

economic condition of the people, though October thunderstorms, ante-monsoonal showers, veering winds, winter frosts are some of the local influences which greatly affect agricultural production.

DISTRIBUTION OF CROPS. An outstanding feature of agriculture is that 75% of the cropped area is occupied by food crops. Among the food crops cereals and pulses occupy almost the entire portion leaving an area of about 4% to vegetables, fruits and sugar cane.



Fig. 61—Rice. 1 dot : 1000 acres.

Jowar is the leading food crop claiming an area of nearly 12 million acres. On the plateau, the 30" isohyet marks its western limit. Cultivation is particularly extensive in the Bijapur, Sholapur valley regions, also along the Bhima Basin in Poona, and in the Tapti valley of Khandesh. It is cultivated

in the central and northern Gujarat, and has a wide distribution in the drier parts of Kathiawar and Cutch. Jowar thus is the main crop of the drier zones and is grown wherever the soils are rich. Nearly two thirds of Jowar crop is raised as a rabi crop. The regions of rabi jowar are obviously the eastern margins of the plateau where the N. E. monsoon precipitation supports its growth. The central belt of the plateau and the Gujarat regions on the other hand produce Kharif crop. The Kharif yield in Gujarat is the heaviest in Western India. Bajri is the complementary crop of lowar in the drier zones, and occupies an area of 60 lakhs acres or 22% of the Gross cropped area. It is grown on poorer soils, and in poorer rainy seasons. Cultivation is particularly intensive in the drier districts of Ahmadnagar, Nasik and Poona, on the poor soils of the trap, along the Malegaon plateau, in Central Gujarat and Northern Kathiawar. It has a heavy yield in Northern Gujarat.

Rice comes third in order of area under cultivation with an area of 25 lakh acres to its credit. Its production is limited to two well known belts of intensive agriculture: the Konkan and Kanara alluvial plains limited by the Sahyadries on the East and by the 40° isohyet in Surat and the sub-Sahyadrian regions limited to their east by the 40° isohyet. Western Khandesh, Panch Mahals, North-eastern Baroda and other Gujarat states, and parts of Kaira and Ahmedabad form the third belt of rice cultivation. In Konkan, it is almost the only crop produced. In the Sub-Sahyadrian belt its cultivation as a drilled crop is extended eastwards wherever possible by means of irrigation. Similarly, in the drier parts of Gujarat it is raised as an irrigated crop.

Nachni or Ragi grown on poorer soils and occupying about 3% of the gross cropped area is the complementary crop of rice in the wet zone.

Wheat has an acreage of 21 lakhs or 6% of the total gross cropped area. Normally, wheat is a commercial, not subsistence, crop. Godavery valley in Nasik and Ahmadnagar, Don and Krishna valleys in Bijapur and Belgaum, the black soil region of Dharwar, the Tapti valley and the Southern Gujarat, and the 'Bhal' region of Kathiawar, are well known wheat producing areas, where good retentive soils, moderate rainfall, and a cool growing season are favourable factors.

Pulses occupy about 3% of the gross cropped area and have a significant part in interculture with the main crops.

Sugar Cane has a small area of 1½ lakh acres, but commercially along with cotton and tobacco, has become a very important crop. The area under sugar cane is rapidly increasing during the last four decades; in the early stages due to the encouraging prices of jaggery, and in more recent years, as a result of the expansion of the Sugar Industry.

in the Krishna, Bhima and Godavery valleys.⁴ The crop is produced on a minor scale in the Konkan tracts under the influence of a heavy rainfall ;

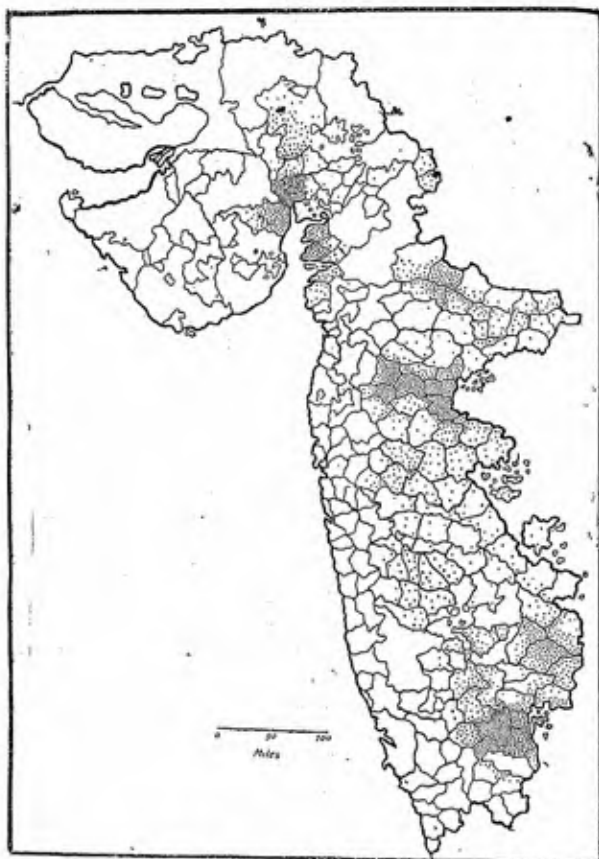


Fig. 62—Wheat. 1 dot : 1000 acres.

4. Indian Sugar Annual 1944. Progress of the Kolhapur sugar mills is representative of this region :

Year :	Estate cane crushed in tons.	Estate area in acres.	Farmers cane in tons.	Sugar Bags produced. (10 Bags 1 ton)	Total crop days.	Actual working days
1933-34	1617	235	16262	15839	85	41
1938-39	32465	1166	15448	53586	140	115
1941-42	50698	1412	11919	76981	155	125

A study of war years will undoubtedly show a further, almost spectacular, growth of the industry.

in the sub-Sahyadrian tracts of the east, tank and well irrigation promotes it to some extent. The best production however is restricted to the canal irrigated areas of the Pravara, Godavery and Nira valleys, and the recent projects in the Krishna-Panchganga Basin. Sugar Cane industry has a still



Fig. 63—Cotton. 1 dot: 1000 acres.

greater future in Western India, if major rivers and their tributaries like the Tapti and the Krishna, are harnessed for irrigation.

Cotton is easily the leading crop of Commerce. Under the influence of the Cotton Textile Industry, its acreage has steadily increased to about

53 lakhs of acres or 18% of the gross cropped area. ✓ Longer rainy season, moderate rainfall, lower winter temperature and a rich retentive soil, have produced five well known zones of cotton cultivation.⁵ In the south it is the eastern Karnatak plateau famous for its 'Jowar', 'Dharwar-American', and 'Jayawant' varieties. The Godavery valley in Ahmednagar is the second Zone. ✓ The Khandesh Cotton Belt with its 'Oomra' variety has the largest acreage under the crop. ✓ To the west of it and separated from it by the Sahyadries is the southern Gujarat cotton producing tract well known for its 'Broach' varieties. ✓ The Ahmedabad-Viramgam plain produces the Dholera cottons, and lastly the Kathiawar alluvial plains have a fairly large acreage in the indigenous though somewhat inferior, varieties of cotton, notably in the Morvi-Dhorandha region, Shetrunja and Bhadar Basins. The economic importance of cotton is well gauged with reference to the localisation and growth of the cotton textile industry in Western India.⁶

Tobacco is the second important commercial crop having an acreage of 2½ lakhs. The crop thrives best in a rich black soil and a moderate rainfall ranging from 25° — 30°. It requires skilled management and curing and hence has a remarkable concentration along the Mahi estuary and the Krishna-Panchaganga which together produce 75% of the total crop. In Gujarat its production is strengthened by irrigation, while in Deccan it has a *girayat* character.

✓ *Oilseeds* in Western India have an area of about 36 lack acres. Safflower, sesamum, groundnut, niger seed and linseed are the leading oilseeds. ✓ Most of these are grown as rabi crops either intercultured with millets or raised as a principal crop. *Safflower* is cultivated in the eastern areas of the Maharashtra and Karnatak plateau where retentive soil offers a great natural advantage. ✓ *Sesamum* is chiefly produced in the Tapti and Godavari valleys, although some area in the lower Bhima and Krishna valleys is devoted to it. On the other hand, groundnuts is a kharif crop and occupies the western belt of the plateau, where a heavier rainfall and clay soils promote their growth. The upper Krishna valley is the principal region of production. Ahmadnagar and Nasik districts are other regions producing this crop. ✓ *Niger seed* has a similar distribution but a greater concentration in the Nasik region, but it is also produced in the coastal belts of Ratnagiri and Thana as it can thrive on shallow soils. *Linseed* is a rabi crop, and is generally grown alone and has a localisation in the eastern districts of the plateau, notably in Bijapur. ✓ *Castor seed* is a minor oilseed crop, and its cultivation is mainly restricted

5. East India Cotton Assn. Annual 1941-42. "A guide to Indian Cottons": Indian Central Cotton Committee.

6. See below: Chapter on Industry.

to the Gujarat Plain, while *Coconut* plays an important role in the agriculture of the Konkan coast where the area under the crop increases from north to south presumably with rainfall and humidity.

AGRICULTURAL REGIONS. If climatic influence, homogeneity in farming practice were to be taken as the basis of our classification, Western India could be distinguished into the following regions :

1. *Konkan and Kanara.* This region extends from Daman to Bhatkal. About 40% is under cultivation. Rice is the main crop occupying 50% of the cultivated area, followed, on inferior soils, by ragi and coconuts. Coconuts gain greater importance southwards. Agricultural economy dominated by the south-west monsoons. Double cropping of rice is possible in the Goa and Kanara. Population is dense on rice lands. Livestock has no place in rural economy, and the sea also does not play a dominant role in economic life as indeed it should be the case with a coastal region. Urban population is negligible and it adheres to the small and decadant estuarine ports. The lateritic plateau parts with its narrow and bleak appearance show a great contrast and as such form a sub-region.

2. *Karnatak Ghats Region.* The agricultural practice of the forested tracts of Karnatak is naturally dominated by forest economy. Only 6% land is under cultivation. Rice and Ragi are the main crops, but sugar cane and spices are commercially important. Shifting cultivation is practised though on a declining scale. The rural population finds itself in two main settlement types: the stringed villages of the spice gardens and the temporary village structures of the shepherds. Commerce attracts the population to the gap towns. Forest restrictions, animal pests and economic isolation are the major problems of the rural community.

3. *Karnatak Belt of Mixed Farming.* A zone of contrasty soils. Rainfall between 30"-40". Tank and Well irrigation. Diverse crops. Sugarcane, Tobacco and Chillies, the leading commercial crops. Rainfall from both Monsoons. Very low incidence of famines. Stable agriculture and large populated villages. Agricultural economy dominated by commercial centres such as Belgaum and Hubli.

4. *Eastern Karnatak.* Black cotton soil, medium rainfall, but a fairly long rainy season with "Rabi" maximum. Cotton leads agricultural production. 35% under cotton. Wheat, a leading 'rabi' crop. Large holdings, 'Jirayat' cultivation. Eastern and central belts, a famine zone. Unstable population; small villages. Absence of large commercial centres.

5. *Krishna Valley.* The reach in the Bombay Provinces, very rich agricultural region with immense crop variety. Sugar cane develop-

ment throughout its length, Intensive agricultural progress in the Krishna—Panchganga Doab, with activity centring round Kolhapur and Sangli. A region famous for its cattle breed. Inam villages, and tenures

6. *The Bhima Basin and the Maharashtra Uplands.* Sharp contrast between intensively cultivated flanks of the Bhima and her tributaries and the 'tablelands' of the trap given to rough pasture, Jowar occupies 45% Bajri 25% cotton and wheat 9% each, of the cultivated area.



Fig. 64—Agricultural Regions.

7. *The Maharashtra Sahyadries.* Limited cultivation, Rice and ragi. Poorer vegetation yields indifferent income from forests. The rich forested parts of Kanara Sahyadries are easily distinguished from this region. Sub-regions: (6a) Khed and Junnar Fruit and vegetable production region; (6b) Poona region of intensive farming; (6c) Maval riceland and grazing tract

8. *The Godavery Valley.* Region similar to No. 6, but has a greater emphasis on Bajri (41%) and Wheat 7% cultivation. Fruit farming increasing in importance especially in the Nasik Taluka.

✓ 9. *The Khandesh Cotton Zone.* Trap and alluvial soils. Intense erosion near the Tapti Banks. Rolling black soil plains intersected by well grown hedges and trees. 50% of the cultivated area under Cotton, Jowar 16% and Bajri 16%. 'Jirayat' agriculture. But fruit farming and betel leaf gardening in local areas where water table favours well irrigation. Large nucleated villages. Rural economy and landscape increasingly marked by elements of cotton industry.

10. *The Western Khandesh and the Satpuras.* Humid conditions common to both; over 45% of the total area under forests. Bajri 25% and Jowar 11%. Rice gains importance on the western margins, and Cotton 30% on the eastern margins of the Tapti valley. Lower density of population; and nomadic economy in the Hills. Dairying and cattle breeding along the immediate Tapti banks. (10a) *The Gujarat Borderlands.* Varied landscape. Greater rain fall. Cultivation restricted to valley floors. Poorer soils 20% of the area under forests and scrubs. Rice 11%, Naize 24%, Gram 10%, Oil seeds 6%. Unhealthy climate; absence of communications; low density of population, small village settlements. A general backwardness in agricultural economy. (10b) Girnar hill-region.

11. *The Narmada and Tapti Estuarine Regions.* ✓ Southern Gujarat, a transitional region in economic development and culture. Soil erosion and flooding. A long growing season with adequate rainfall. Less liable to famines than the northern portion. Heavy cultivation: 71% of the total area. Varied crop production: Jowar 11%, Wheat 12%, Cotton 18%, and also Tobacco, Pulses. ✓ A region of commercial agriculture producing Wheat and Cotton. 40% the cropped area under food crops & 60% under non-food. Dense rural population distributed in large compact villages.

✓ 12. *The Central Gujarat.* Underlain by the trappean and alluvial black soil with mixed belts along the gulf of Cambay, and the north-eastern border lands. A region due to the erosion by the Mahi and her tributaries. The loam belts, the most productive and varied in crop productive. Practically all land under cultivation. Growing season about 140 days, but declining in northern areas. Jowar 20%, Bajri 80%, Wheat 6%, Cotton 15%. (12a) *The Charotar* region: famous for its intensive cultivation, cattle breeding and dairying, the northern talukas for Cotton, and also Broach where it covers 47% of the cultivated area. (12b) *The 'Nal' wheat lands.*

13. *The Northern Gujarat.* Ahmedabad-Viramgam Cotton Zone; ✓ similar to 12, but drier condition. 13(a) Morvi-Dhrangdra-Nawanagar cotton tract.

14. *The Kathiawad Lowland Basins.* ✓ Gohilwad, Shetrunja and Bhadar underlain by trappean black soils. Topography marked by trap

dyke hills. Many marshy and ill drained patches, especially in the Gohilwad and Bhadar. Wheat the major crop in Gohilwad. Variety in crop production in the Bhadar; cotton in the Gondal region. Agricultural community settled in large compact villages in spite of high urban element. Liable to famine. Routes, markets and ports, creations of commerical development Bhavnagar in Gohilwad and Porbandar in the Bhadar, the geographical outlets to the agricultural products.

15. *The Halar and the Cutch*. Aridity and river erosion in arid soils, characteristic of both the regions. Extensive development of mangrove swamps along the lowlands of the Gulf of Cutch. Cultivation restricted to drier crop types like the Jowar, Bajri and Wheat and in some areas Cotton. Frequent famines; importance of the live stock industry—especially sheep and camel. Rural community in compact and walled settlements, but an appreciable nomadic element. Commerical activity in administrative towns and ports.

GENERAL REFERENCES:

1. Statistical Atlas: Bombay Presidency; 1925.
2. Season and Crop Reports.
3. Irrigation Administration Reports.
4. Bulletins of the Department of Agriculture, Bombay.
5. Returns of the District Inspectors of Land Records; Bombay.
6. Statistical Returns from the States in Western India.

TABLE I
Statistical Summary 1940-41

Name	Total area	Net cultd.	Net irrigated	Forest	Rice	Wheat	Jowar	Cotton	Tobacco	Sugar Cane	Oil seeds
1	2	3	4	5	6	7	8	9	10	11	12
1. Bombay Province ..	48719850	28713369	1107784	8305345	1969891	17517338	155422	3884652	173935	116836	2559730
2. Kathiawar States ..											
Cutch ..	843000	516000	41000	218240	...	8042	113700	30097	...	13	4122
Nawanagar ...	2013432	940924	102230	672070	452	9282	296126	34938	...	1199	153164
Dhrol ..	1811140	92377	10843	720702	12	1406	45634	807	...	183	25142
Limdi ..	114504	112404	2100	800	100	17000	125000	18000	...	...	55
Dhrangdhra ..sq.in. 1167	358804	2705	...	...	...	1587	12839	173895	...	...	3997
Junagad ..	1046030	414075	591310	414075	4066	10950	70750	152800	...	2030	1608875
Bhavnagar ..	1897759	744469	*	*	...	33172	...	161447	...	2003	169979
Rajkot ..sq.in. 282	107548	970	...	...	279	3942	27446	2202	...	22	...
Wadhwan ..	154957	116869	1689	...	...	1779	23143	58789	...	9	25796
Wankavar ..	282065	273045	402	9020	...	980	10057	83839	...	140	1635
Wankaner ...	264560	916'6	29'0	22135	37	1493	25630	13328	...	42	418
Ghndal ..	452057	352631	40438	42400	955	3467	51604	20947	...	161	11335
Jetpur ..	33092	24829	2179	2640	25	420	6710	1089	...	11	710014
3. Baroda ..	5047523	627902	151012	456342	175936	74279	664512	862426	51550	3927	224570

* Not available

	1	2	3	4	5	6	7	8	9	10	11	12
4. Gujarat States. . .												
Sachin	..	28882	21804	1688	—	1102	23	5099	6345	—	66	676
Rajpipla	..	1517 sq. m.	330435	—	290883	32164	900	57876	174913	1835	27	5136
Dharampur	..	704 sq. m.	146'10	—	7320	23072	—	—	1114	—	127	—
Devgad Baria	..	813 sq. m.	391118	—	3.9319	33100	1015	5300	7375	—	15	31860
Jawhar	..	197120	1117940	—	48941	18844	—	—	—	—	—	1505
5. Deccan States.												
Kolhapur	...	3217 sq. m.	1066037	58667	330	165 23	13609	157514	31129	40118	21552	114815
Mudhol	..	235835	13135	2242	13209	28	31414	77321	77321	—	95	13520
Aklakot	..	313811	284333	10678	4271	376	2231	14997	2397	6388	117	121959
Phaltan	..	254043	163314	21833	12993	8	1500	115868	1250	20	5340	13078

CHAPTER XIII

Industrial Geography of Western India.

5. THE ROLE OF INDUSTRY. That the regions of Western India participate in the general industrial backwardness of the country needs no emphasis. According to the latest census reports, about 10% of the population is engaged in industry. Industry is yet unimportant in economic life. Political fragmentation of the region into Bombay Province and Western India States, unequal economic development of some parts like Kathiawar, and the industrial policy and progress of India, have introduced an immense variation in the industrial landscape. The industrial structure is yet in a transitional stage, ranging from the most elementary type as the village carpentry to the most advanced as the Textile Mills of the Bombay City. The industrial landscape is marked by sudden and emphatic changes from the village industrial pattern to the crowded slums of city life¹. Historical momentum as well as geographical factors largely account for the present distribution and development of industry in Western India.

HISTORY. The present industrial geography of this region, as in the rest of India, is partly a vestige of the past, and partly the product of the Western Industrialism of the present. In the days of economic self-sufficiency and isolation, the rural population depended on the local handicrafts. Specialised needs were supplied by the more artistic wares of urban centres that were famous during the Ancient and Medieval periods. The products of Ilkal and Badami in Karnatak, were known to the Greeks. Ivory and Sandalwood carvings of Kanara found a ready market in the Persian Gulf. Surat was famous for its Gold and Silk thread industry. Silk products of Yeola, paper from Junnar, metalware of Nasik had extensive markets. With the advent of British rule, however, there set in a decline in these urban handicrafts due to a variety of factors. The encouragement received from the E. I. Company in its early stages soon came to an end. This was inevitable in face of the Revolution in English Industry during the 18th and 19th centuries. Increasing competition from the machine made products, loss of the patronage of Indian Courts, an alien Governmental policy, change in public taste, the illiteracy and conservatism

1. In the West, the industries have radically altered the face of the land, as in the Black Country of the English Midlands; instead: The British Isles; p. 165.

of the artisan and the exploiting methods of the 'Karkhandars' the merchant capitalists, severely handicapped these urban industries.² And now the machine has altered the local industrial pattern. It has promoted large scale industry in select areas. It has changed the economic organisation of some urban industries. Use of power and machinery have enlarged some industries, as the ginning and pressing, and, have made them 'medium' sized industries. Thus recent history largely explains the industrial map of Western India with its wide dispersal of



Fig. 65. *Distribution of small scale industries.*

1. Cotton textiles. 2. Finer Fabrics. 3. Metalware. 4. Paper. 5. Sandalwood and Ivory
6. Dying 7. Dairying, Cattle and Vegetable gardening 8. Woollen.

the village industry, the chosen urban handicraft centres, and the concentrations of modern industry.

PATTERNS OF INDUSTRIAL LANDSCAPE. In studying the geography of different industries, it is the pattern of landscape that is created by the industrial unit that matters most. It represents a part of culture, shaped by man. It exhibits the nature of change that has been introduced by human agency on the earth's surface, on 'the vegetal carpet'. It at once

2. B. E. I. S. Report : 1940 ; Vol I ; Chap. VI.

introduces a contrast between natural areas untouched by human hand, like the virgin forests, and the agricultural tracts and closely built-up urban dwellings influenced by industry and commerce. From this point of view the industrial organisation of Western India must be grouped into three categories: the village, handicrafts, the urban handicrafts, and the modern Industrial Units. In a sense, the village handicrafts form a part of the agricultural economy and rural landscape. It does not make the village or the homestead, distinctive in appearance. Industries like the village carpentry, pottery, smithy, dairying and the livestock, do not normally depart from the agricultural scene. Although here too, it must be added, a regional specialisation as the dairying district of Anand in Gujarat, may make the landscape quite distinctive from the usual agricultural surroundings. Urban handicrafts, thus, are more important. They present a specialised landscape that is quaint, and historical. Such urban towns breathe an historical air. The dwellings are old, and perhaps renovated with a modern superstructure; the roads are narrow, and often in the medieval fashion, cobbled. The inhabitants are a specialised class, generally belonging to one community, and claiming hereditary skill in their occupation. The urban life weaves around the technical processes and the economic needs of this section. Such are the urban handicraft centres like Surat in Gujarat, Junnar in Maharashtra, and Guledgud in Karnatak. It must be noted however that this pattern of industrial landscape is fast disappearing under the impact of modern cultural forces. Such towns lose their individuality when they are chosen as administrative centres, district or taluka headquarters, or when they become commercial centres, or when new industry finds its way in their precincts. Modern Industry has come as a great impact. It has introduced a sudden and almost catastrophic change in the landscape. The contrast is heightened because it is restricted to a small place like a town or city. Usually modern finance and modern industry make a joint appearance, as in Bombay or Ahmedabad, and alter the face of the agglomeration. With the construction of modern buildings for banks, for industry, for the industrial working classes, the landscape of the town is forced out of its original agricultural environment. The city then begins to grow outwards and invades the rural interior along its roads and railways, and presents a great cultural contrast to the surrounding agricultural areas, as in case of Bombay City in the North Konkan Coastlands.

VILLAGE HANDICRAFTS. These are the subsidiary rural or part-time cottage industries, like the village carpentry, pottery and dairying. So great is the diffusion of these industries that an adequate statistical consideration on regional basis is hardly possible at present. More-over

some part-time industries cater to the routine needs of the agricultural community, and are accordingly distributed almost evenly throughout Western India. Of these, only some stand out prominently in the rural landscape because of their geographical distinctiveness. They are the product of the local agricultural environment, and yet they emphasise their speciality in the region. Such is the ancient *handspinning and weaving industry*, localised in all the cotton producing districts of Western India. The industry finds a wide diffusion in the north-east Kathiawar, northern and central Gujarat, the east Khandesh, the eastern districts of Maharashtra and Karnatak. Almost every homestead in these regions produces some coarse yarn and cloth for domestic consumption. This is a subsidiary occupation of the farming community during the slack season.

✓ *Sheep-breeding* is another industry which finds a diffusion in the grasslands tracts of northern and central Kathiawar, parts of Khandesh, the residual hill tracts of Eastern Maharashtra and Karnatak. This supports local *Woollen industry* which produces coarse woollen cloth, and has a speciality in some centres like Ranibennur, in blankets. Indeed, it may be said that the indigenous cotton and woollen industries of the drier parts of Western India have a complementary distribution. Cotton adheres to the richer soils, and the poorer soils having rough pasture are devoted to sheep-grazing.

✓ The forest environment of the Sahyadries, the Satpuras, and the Girnar has promoted industries related to wood. *Bamboo-work* is indigenous to Kanara. Building wood and furniture belong to the teak bearing areas of the Sahyadries. *Charcoal* finds its localisation in the interior parts of the Sahyadries and in the thorn-forest formations of the Eastern belt, the Satpuras and the Gujarat and Kathiawar hill tracts. The forests have similarly promoted local effort in *seed-oil extraction*, *catechu-rosha-grass oil*, and *hides and skins*.

✓ Richer grassland regions have produced well known *cattle breeding* and *dairying* industries, like the 'Gir' cattle in Central Kathiawar, and the famous dairying industry of the Krishna basin. The Charotar of Gujarat is a famous dairying region which finds a close counterpart in the riveraine tracts of Khandesh. Good rainfall, fertile meadow lands and irrigation are the common advantages in all these regions. The distribution of *Fruit cultivation and vegetable gardening* shows the considerable influence of the urban markets. Cities generally offer a strong economic stimulus to agricultural surroundings, and there is a consequent displacement of seasonal crops by the more intensive forms of production. It is not only the vicinity of fertile area, but the means of communication that influence such development of vegetable gardening industry. Bombay has promoted a belt of gardens along the Bassein-Dahanu coast line.

Similarly the Ulhas basin shows a promise in such developments because of its two major advantages, the G. I. P. route via Kalyan and the tail waters of the Hydro-Electric Works at Khopoli. The environs of Poona also illustrate the same tendency for the land to pass under more intensive production. Fruit gardening on the other hand has a specialisation in certain parts of Western India, notably due to local advantages of soil and climate. Such are the regions of the Nasik Basin, the Khed-Junnar tract, and the Purandhar Zone of the Nira Valley. This type of agricultural industry is yet in the stage of infancy. Considerable development is

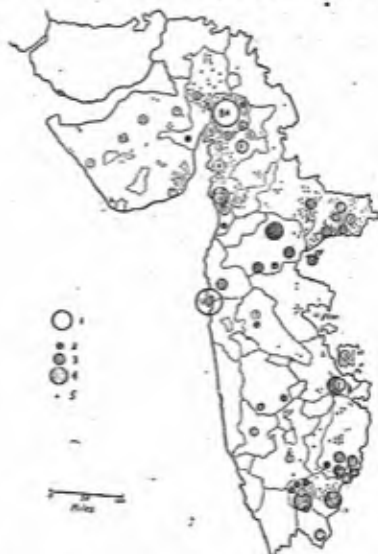


Fig. 65—Distribution of Cotton Textile Factories.

1. Major industrial centres; number of mills indicated in circle 2 Handlooms: 100-500.
3 between 500-3000; 4. between 3000-6200; 5. Gins and Presses.

possible in the Sahyadries, and the valley tracts of the plateau regions, only if suitable transport facilities were to be extended to select localities.

URBAN HANDICRAFTS. Quite in a different category stand the urban cottage industries for which India has been so famous since the days of antiquity. These whole-time occupations are products of hereditary skill and tradition and command a wider market. The localisation of such industries in Western India shows certain interesting trends. Beginning a regional study from Bombay Karnatak one finds that the *handloom*

industry is localised in cotton growing tracts of Bijapur, Belgaum and Dharwar. The total number of looms in these three leading centres exceeds 18000.³ The Guledgud-Iikal zone leads others in the production of its famous saris and khans. Next in importance are Gadag, Hubli, Belgaum and Gokak. The same type of localisation is seen in the cotton growing tracts of the Maharashtra Plateau. Sholapur, Walsang, Sangola form its southern nucleus. North of it lies Ahmadnagar and its famous neighbours Pathardi and Bhingar. The holy city of Paithan which is now in the Nizam's state, was in the past an inspiration to the industry. West of it, is Poona once the seat of Peshwa administration where court patronage produced a flourishing industry. Khandesh has the greatest measure of localisation with looms estimated to be over 16000 in 1932. Malegaon in the Girna Basin attracted weavers in the 17th century and from that time remained one of the leading centres. Its products were sent to Berar, the Nizam's State and Bombay. Though not in the heyday of prosperity, Malegaon still retains its specialisation. Other centres like Dhulia, Jalgaon and Parola, are of subsidiary importance but they show the localisation of the handloom industry in the leading cotton growing zone of Western India. In Gujarat, there is no such wide dispersion of the industry available in Maharashtra and Karnatak. Only Surat, Ahmedabad, Baroda, and to some extent Sanand, Dhollera and Dhanduka are its centres. Statistics relating to Kathiawar are incomplete but it is well known that Bhavnagar, Gondal, Wadhwan, Rajkot and Jamnagar, are leading centres. The production is not on large scale and the number of looms does not probably exceed 2500.⁴

SILK WOOL AND FINER FABRICS. Among other textile products the silk products of Yeola, Poona, and Surat command a wide market, but like other cottage industries, it is in a depressed state. In Yeola and Poona, the industry had its start under monopoly and local patronage. The raw material had necessarily to be imported. Its products Paithanis Pitambars and Kads had a ready market at well known fairs and trade centres.⁵ Surat industry also rose under state patronage. But the town is more well-known for its gold and silver thread industry. It has a ready market and also it supports the local Kinkhab industry.⁶ Baroda and Ahmedabad are other centres producing similar products.

OTHER URBAN HANDICRAFTS. Of the other urban handicrafts none has the wide distribution that is enjoyed by the handloom industry. They

3. Telang : p. 22; B. E. I. S. Report I; p. 59; Belgaum : p. 9.

4. Gondal alone records over 1000 looms. Trivedi : Kathiawar Economics; p. 160.

5. B. E. I. S. Report : Nasik; p. 10.

6. B. E. I. S. Report : Surat; p. 12.

play an important part in local economy, and great is their significance from the point of view of preservation of traditional skill. The *sandal-wood and ivory products* of N. Kanara though in a decadent state evince the attempts of human hand to find an expression through unusual medium. Though the *woollen industry* is widely diffused in the sheep rearing grassland of the plateau, local products such as Namadahs of Virohal in Khandesh command a wider market. ✓ *Calico printing and dying* found its early support in the areas of hand loom production. Khandesh was the best known region producing odhanis, pasodies, zazams and razais of artistic design. ✓ *Dying industry* was dependent on local vegetable products and the available water supply. ✓ *Localisation of the industry in Nawanagar* where waters of the Rangamati are found to be suitable for the purpose, is an interesting case showing earlier factors of localisation. With the introduction of machine technique in printing and aniline dyes the industries have declined almost to a point of non-existence.

The *paper industry* of Western India illustrates the rise and decline of an industry supported entirely by local patronage. Only in case of Erandoli the industry dated from a long time. It was introduced later in Poona, Nasik, and Junnar. As a matter of State policy craftsmen were encouraged to settle in these centres, but for their raw materials they had to depend upon local supplies. ✓ *Machinemade paper* has seriously threatened the position of this industry, although attempts are made to revive it under the village industries scheme and by finding out new centres for further development. ✓ *Metal handicrafts including brass, copper, silver and gold* are the result of urban patronage and hereditary skill. Its localisation bears little relation to the supplies of raw materials required. Poona, Nasik, Sangli, Belgaum, Baroda and Morvi are still famous centres for metal work. *Toy-making* of Savantwadi and Gokak is yet another industry that deserves mention because it is the product of natural environment and may be compared with similar products of the forest regions of Germany.

MODERN INDUSTRY. With the increasing precision in the manufacturing processes and the changing urban structures, many cottage industries have changed their organisation. In general, they increase the scale of their economic organisation owing to the introduction of machine power and greater pace in production. Such are, to name a few, the industries of oil pressing, cotton gins and presses, leather, hosiery, paints, rice and flour mills. Perhaps the most interesting point about them is their purely urban localisation. They

thrive under a sophisticated demand and form a cog in the urban economic wheel. Similarly urbanisation and industrialisation produce another set of industries which are practically new to the region. These are the engineering repair shops, machine made metal ware, and furniture industries. They are a necessary component of the urban structure. In a survey as this, their regional consideration is of a secondary importance, because the strength of the urban economic structure as in case of Bombay and Poona will always govern the number and type of such industries found in a city. But of supreme importance is the survey of localisation of our major large scale industries, since they in the main, almost overlapping the earlier type of industry in Western India, have given the region the stamp of progress and prosperity.

THE COTTON TEXTILE INDUSTRY. This is easily the foremost of the modern industries in Western India. In fact its localisation in Bombay Sholapur and Ahmedabad has made this region the leader of the Indian Cotton Textile Industry⁸

The cotton tracts, of Gujarat, Kathiawar and Khandesh, financial stimulus from Bombay, adequate labour supply from the agricultural interior and the immediate background of local markets were the main factors that lead to the establishment of this industry in the Bombay Island after the American Civil War. The success of Bombay was later copied by other centres, and thus regionally, we have five definite zones of localisation: Bombay, Ahmedabad, the East Khandesh and Sholapur, with their satellite points in the interior of the cotton growing tract.

THE BOMBAY INDUSTRY. The credit of inaugurating the cotton mill industry in India goes to Bombay where the first mill was started under the enterprise of Mr. J. N. Tata in 1856. Under the ægis of the American Civil War the industry made rapid strides. The cotton growing districts of Gujarat and Deccan, and the labour power of the Konkan gave Bombay a better advantage than Calcutta, although the latter was better situated in respect of coal. In spite of the tariff restrictions of the period 1830-1900, difficult monetary situation and the Japanese competition, the Indian industry grew, and Bombay's share in the progress was increasingly greater up to the end of the war of 1914-1918. The period 1885-1895 saw a general introduction of Ring spinning, and the rise of Currimbhoy and Sassoon groups. Between 1895-1895, the progress was slow owing to ravages of plague in the city and famine conditions in the cotton tracts.

The Swadeshi movement of 1905-1910 somewhat counterbalanced the Japanese competition, mismanagement and Japan nevertheless acted as

deterrent to the industry. During the first World War the industry received a stimulus that was further strengthened by the Swadeshi movement of 1920. During all these stages increase in machinery was a marked feature of the Bombay industry. As compared to other centres, it must be said that Bombay made rapid strides in spite of several local and national handicaps. It is only in the recent years that there has been a set back on account of several factors, but even then the present position of the industry remains substantial.⁹ The average unit of production in Bombay is larger than in any other centre in India, and hence Bombay's share in the Industry still remains dominant. It is interesting to note in this connection the special features of Bombay Industry as regards production of cloth and its markets. In the production of yarn, Bombay's share is even now substantial, but declining. Bombay industry produces mainly coarser yarn between 11-30 counts. In woven goods, Bombay's specialisation lies in coloured piece goods, grey shirtings and longcloth. Bombay yarn has a good home market, but its trade in this product with China and the Middle East was a speciality. Major portion of its cloth is marketed at home, but before the Japanese competition, the Middle East and African colonies offered a good market.

The localisation of the Bombay industry started with a nucleus in the middle of Bombay Island, in Parel area.¹⁰ This was evidently due to adequate land available in the centre of the Island, and to the easy land communications, and the harbour frontage on the east. Between the mill area proper and the middle class dwelling areas of Girgaum and Kalbadevi, there arose the working class living quarters. The growth of the City naturally produced slums. The industrial area was, by the beginning of the present century, encircled on the north by the suburban areas of Dadar and Matunga. The little expansion which the industry is recording today consists largely in re-organisation and realignment, such as the use of hydro-electric power to replace coal. It is interesting to note therefore that although the other industries are growing in the limits of greater Bombay, the Cotton industry there does not occupy a prominent place.

The general decline of the Bombay industry of late is attributed to many causes.¹¹ The Managing Agency System is much criticised on grounds of vested interests and lack of initiative. The costs of production are on the increase because of high taxation, cost of water supply and fuel, although there has been some economy with the introduction of electric power. Obsolete machinery and overcapitalisation are other serious drawbacks preventing the industry to with-stand competition. The very

9. Table I.

10. A. I. M. O. Monograph No. 3; Industries in Bombay City.

11. Vakil: Growth of Trade and Industry in Modern India; p. 153.

localisation of the industry in Bombay Island is challenged by some economists on grounds of distance from the source of raw materials, labour supply, and markets. It is also argued that Bombay is more suitable for production of finer counts on account of its humid climate, but it produces coarser counts. Further, Bombay has to face the competition of the imported material which are landed directly in the Port, entailing a saving on inland transport costs in their case. Although the second World War created boom conditions for the industry, it cannot be said that it is free from these basic drawbacks in its organisation.¹²

OTHER CENTRES. The Ahmedabad Industry is rooted in the tradition of the Gujarat handicrafts. Although the first mill was started in 1859, it was only by the beginning of this century that the local industry showed signs of activity, and reached a vigorous stage during the inter-war years. In this period there was an all round progress.¹³ The industry found a superior advantage in cheap land, lower labour costs, surrounding cotton growing areas, and the local finance. Further, the lessons of the Bombay industry enabled Ahmedabad to avoid many pitfalls in its adolescence, and very soon it recorded an expansion in the quality and quantity of products and in capturing the home as well as the Middle East market. Ahmedabad today boasts of a better organisation and equipment, and produces finer fabrics than Bombay, although it is well known that in the production of finer and coarser counts the roles of Ahmedabad and Bombay ought to be just the reverse. Cotton growing areas and cheap local labour have promoted other centres of industry in Gujarat. Such as the commercial towns of Surat, Baroda and Navsari, where the trading community have displayed a vigour in organising industry.¹⁴ Similar development has taken place in East Khandesh, Sholapur and Hubli, where commercial activity of the towns leads to industrial enterprise. Gokak is to some extent an exception, in that the localisation of the mill there is due to the hydro-electric power from the Falls.

OTHER INDUSTRIES. The location of other industries in Western India is, with the exception of the Sugar, indeed complex. It is an outcome of a variety of influences. Sugar industry has made a rapid progress in the irrigated basins of the Godavary, Nira and Krishna-Panchganga.¹⁵ Recent

12. Indian Finance Year Book; 1947. p. 77.

13. Ahmedabad and Sholapur Industry still await a detailed regional investigation. For a brief history of the Ahmedabad industry, reference may be made to Indian Textile Journal Vol. XII p. 114.

14. Surat : Textile Factories: 1029, workers 3300; (1936)

15. In Bombay Province there are at present 14 Sugar Factories, each with a daily average Cane crushing capacity of 400 tons, Godavary Basin has 7 mills; Nira and Bhira 4; Krishna-Panchganga 3.

political events have given a further stimulus to the industry, and the prosperity of the existing centres like Belapur, Kalamb and Kolhapur may well be repeated at several other points in these basins, where large-scale irrigation, easier communications and finance are possible. Other industries like the engineering, printing, food processing are so to say bye products of urban life, and thus have a noteworthy concentration in bigger cities like Bombay and Poona, although they have their miniature replicas in many lesser towns.¹⁶



Fig. 66—Industrial Regions.

Key: 1. Well developed regions. 2. Potential regions. 3. Hydro-electric power belt.
4. Mineral possibilities.

For Industrial regions, see text.

Although, as has been pointed out earlier, the industrial landscape of this country does not produce that contrast to surrounding agricultural regions, which is so typical in the manufacturing countries of Europe, it is possible to recognise the following potential as well as developed regions:

1. *Okha*: Cement, Chemicals; 1a. *Dhrangdhra-Morvi*: a sub-region of Okha, 1b. *Bhavnagar*: the third industrial region of Kathiawar, with bias to cotton textiles.

16. Table 2,

2. *Ahmedabad* : the leading industrial region of Gujarat ; Cotton textiles and many subsidiary industries. 2a. *Broach* ; 2b. *Surat* ; 2c. *Baroda* ; Cotton textiles ; the same industrial pattern as in Ahmedabad.

3. *The East Khandesh* : an essentially Cotton textile tract, with Amalner, Jalgaon and Dhulia as centres ; dairying and gardens have a scope for development. 3a. *Malegaon* ; 3b. *The Satpura forest regions* : a potential region, for developing industries based on forest products, and power, mainly hydro-electric, resources.

4. *Poona-Kirkee-Lonavla belt* : a region of complex production ; considerably influenced by defence industries ; possibility of ribbon in development by industrial units along the railway route, 4a. *Nasik*, and 4b. *Kopergaon basins* : prospects for intensive agriculture, and for semi-agricultural industries like Sugar and Fruit.

5. *Bombay Metropolitan Region and the Suburbs* : up to Kalyan and Bassein.

6. *Sholapur* : an isolated but well developed cotton textile centre amidst agricultural surroundings.

7. *Krishna-Panchganga basin* : a region of intensive economic effort in agriculture and industry. Sugar Cane the leading industry ; allied industries : textile, tobacco, engineering. Industrial centres : Kolhapur, Sangli, Kirsoskarwadi, Karad. With the development of hydro-electricity and irrigation it is possible to promote several industries like aluminium, Sugar, power alcohol. 7a. Extension of No. 7 down the Krishna Valley.

8. *Dharwar-Hubli*. 8a. *Gadag-Betgeri*. 8b. *Bagalkot-Guledgad-Ilkal* ; 8c. *Belgaum-Shahapur*.

9. *Kanara Coast* : Fisheries and Forest Products.

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3. Census of India, 1941 Bombay.
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6. Indian Cotton Textile Industry : M. P. Gandhi.
7. Indian Textile Journal, Vols. III, XLI.
8. Indian Cotton Industry : Pearce.
9. Port of Bombay : Bombay Port Trust.

TABLE I

Textiles: Bombay, Ahmedabad, and rest of India. (1946)

	No of Mills	Looms	Spindles	Workers
Bombay	... 74	68300	2935000	164000
Ahmedabad	... 84	50800	2041000	114000
Rest	... 21	80900	4830000	400000

TABLE II

Major Industrial units in the Bombay City, Poona and Ahmedabad (1938)

Bombay				
	Textiles	Engineering	Chemicals	Printing
No. of Factories	... 132	235	62	178
Workers	... 171000	20000	9100	7600
Poona				
No. of Factories	... 3	23	1	32
Workers	... 1600	700	42	1900
Ahmedabad				
No. of Factories	... 109	700	45	8
Workers	... 114000	1500	2300	1100

(These relate to Bombay City, and, Poona and Ahmedabad districts where most industrial units are concentrated in the head-quarters towns.)

CHAPTER XIV

Administrative Geography and Planning Regions.

As has been pointed out in the first chapter, the region of Western India has an area of 838795 sq. miles and a population exceeding 38 millions according to the latest census.¹ Within this geographical entity, however, lie the different administrative divisions that run across the natural regions and introduce administrative and political barriers. Its northern zone almost entirely belongs to the Indian States. Cutch which geographically marks a transition from wet to desert region has an area



Fig. 67—Western India : Bombay Districts and the States areas.
For the names of administrative units refer to Fig. 58.

of 7600 sq. miles. The gulf of Cutch on one side and the Rann barrier on the other explain the isolated position of the state and the evolution of its quaint customs and social setting. The Kathiawar Peninsula is a

1. Chapter 1; p. 17.

kaleidoscopic panorama in administration. Its area of 38003 sq. miles is divided between 18 leading states, nearly 30 minor states and estates, the districts of Amreli and Okha which belong to the Baroda State, the small Portuguese settlement of Diu, and the talukas of Dholera and Ghoga which form a part of the Ahmedabad district.²

In the disharmony between the geographical setting and political divisions of Kathiawar lies the explanation of its retarded economic and social development. The states boundaries have been a product of historical accidents and hardly bear any relation to the natural setting. Thus the regions of the Bhal and the Bhadar Basins have been fragmented between a multitude of major and minor states. Some have had a progressive rule and a better economic development. The recent improvement of certain Kathiawar ports is an index of the new awakening in the Peninsula, but still inter-state restrictions and the Viramgam Cordon act as barriers to free movement, and Kathiawar as a whole continues in its medieval setting, a land of old towns and worn out customs, of unequal economic development and political awakening. The policy of amalgamation of the lesser states, recently initiated by the Government of India is to be welcomed from the point of view of social and economic welfare of the Peninsula and the removal of anachronisms in local administration.³

The Gujarat administration falls into three distinct categories irrespective of any natural homogeneity. Out of an area of 3000 sq. miles the Bombay districts occupy a little less than half, Baroda is the leader among the States with 8,000 sq. miles, and the fourteen States with their satellites cover 7500 sq. miles. A major portion of Baroda lies in the south Gujarat alluvial plain between the Mahi and Narbada rivers, with an outlier in Navsari at the Tapti Mouth. Westwards the State touches the highland fringe of the north-east. Its size and population, natural wealth and a long period of enlightened administration, have placed Baroda as one of the progressive states in Western India. Industrialisation through cotton textiles and chemicals, development of fisheries and forests, and a policy rationalising agriculture are the main trends of its recent administrative policy. A characteristic feature in the position of the Gujarat States is their 'location' along the hilly tracts of the north-east. Excepting Cambay and Baroda almost all important states belong to this highland belt.

2. Census of India ; Bombay : 1941, p. 4. Census of India ; W I. States ; 1931.

3. This account was written before the significant, and seemingly impossible before the Indian Independence, changes took place in creating the Saurashtra Province and in the merger of the Deccan States in the Bombay Province. The argument however, in the opinion of the author, will not loose its force till the new administrative framework fully establishes its alignment and guides the social and economic activities of the inhabitants.

The explanation would seem to lie in the facts of recent past. The Peshwa and the Gaikwads held the supreme authority over Gujarat, but retained under them a number of small rulers to guard local territories and strategic points. On the smaller states of the Malva and Rewa borders fell the task of guarding the routes from the Central India. With the destruction of the Suzerain Maratha authority and on the Gaikwad's acceptance of a subordinate status under the British rule, these states continued their existence on the basis of new treaty relations with the British Paramount Power. These occupy an area almost equal to that of Baroda, but their poor natural environment deny them the importance and economic advantages that the "Plains" districts enjoy. The state of Cambay is a reminder of the glories of the Mogul rule and the importance of controlling the trade of the Gulf in the interests of the northern Moghul Subha and to safeguard the Haj pilgrimage route. Similarly, the small area of Daman is a vestige of the 17th C. maritime power of the Portuguese.

Similarly, recent history explains the distribution of the Deccan States. Strange as it would appear, portion of States territory in Maharashtra is small as compared to that in Gujarat, and in Karnatak it is much smaller. In the total area of 65900 sq. miles, belonging to the Maharashtra and Karnatak territories in Bombay Province, only 10870 sq.m. is occupied by the Deccan States. This is obviously due to the utter defeat of the Peshwas in 1818, and the annexation of their territory by the East India Company. The Khandesh valley which was administered by the Peshwas directly because of its strategic importance as a gateway to the north passed into British hands after 1818. But the subsidiary states of the Sahyadry border continued their existence. Dharampur and the Dangs belong to this region. In the Maharashtra plateau, similarly, the subsidiary rulers of Aundh and Bhore, stationed at strategic route centres, were allowed to continue even after the Maratha rule. The state of Akalkot was a Maratha creation to guard the south-east frontier against the Nizam.

In the "Swaraj", the early Chattrapaties and the Peshawas preferred to maintain a direct rule, except on the strategic approaches where these subordinate military chiefs were stationed and given a greater freedom in administration. The rise of the Patwardhan family in the southern Maharashtra and in the Krishna and Tungabhadra Doab, and their location in Sangli, Miraj and Kurundwad, must be explained solely in this context. Almost all these subordinate states entered into new treaty relations with the East India Company and preserved their hold on the territories. The fragmented appearance of the Patwardhan states, is largely due to their seats of administration being situated on strategic points. The case of Kolhapur lies in a special category. After the Schism of the house of Shivaji in 1700, the branch of

Rajaram Chattrapati established itself at Kolhapur, and throughout the Maratha history it maintained its distinct political state even developing on occasions a hostile attitude to Satara. In 1812 the State concluded a treaty with the British and were allowed to retain their territory and due political privileges under the paramount power. Within its own administrative frame work the existence of its own feudatory states like Vishalgad and Bavada serves as a reminder of greater political organisation of the Marathas. Economically the state is well placed within the fertile tract of the Panchganga and her tributaries. A variety of crop production is possible. Agriculture thrives in the region because rain failure is practically unknown, and it has of late received a stimulus through the development of the Sugarcane Industry. The Radhanagari project is expected to release a new source of energy through Hydel power and irrigation. Bauxite deposits in the Sahyadry backbone show a good prospect.

In Karnatak, the central strip as indicated above, is occupied by the Patwardhan States with the exception of Mudhol which is a creation of the Bahamani rulers. Savanur on the other hand has had an interesting history after the extinction of the Adilshahi at the close of the 17th century. The Mogul Viceroy transferred his seat of administration from Bijapur to the more central position of Bankapur which had the strategic advantage of being on the main line of communications. Subsequently he chose Savanur as the seat of administration. In later history Savanur played an important diplomatic role between the three neighbours, the Marathas, the Nizam and Hyder Ali. With the annexation of Karnatak to the British Territory in 1818, Savanur continued its subordinate position under the British.

The Kanara and Konkan Coastal strip is conspicuous by the comparative absence of Indian States. Savantwadi was a subsidiary state of the Maratha Empire. Janjira and Jawhar have an earlier history when the trade relations with the Persian Gulf and Africa were strong and resulted into the settling of these States.

It may be noted from this general survey that the political geography of Western India is largely the product of historical events. But from the regional point of view two generalisations are possible:—(1) That most of the states were subordinate in status to the major ruling power, first the Marathas, and then the British, and they owed their existence to the strategic importance of their charge. (2) That in the political settlement which followed the defeat of the Marathas, these states were allowed to retain what they had, irrespective of any consideration of their geographical setting. In these two geographical facts, largely lies the pattern of distribution of the States territory within Western India and explains

the relatively unequal economic and political development of the region.

POLITICAL FRAGMENTATION AND ECONOMIC UNITY. The foregoing administrative survey and a reference to Figs 19 and 58, show clearly the state of maladjustment between the administrative units and the economically homogeneous areas. The Kathiawar Peninsula shows the position in the extreme.⁴ The fertile basins of the Bhal and the Bhadar, the Halar coast have been denied economic unity. Similarly the Gujarat plain is at many places intersected by the States areas. The rich Charotar for example is divided between several administrative authorities. The southern Gujarat coast is a homogenous region. Yet, at many places Baroda, Daman and Sachin have introduced artificial barriers. The Deccan States, fortunately have not cut across rich areas endowed by Nature, except in two cases. Most of the Deccan States occupy strategically important but economically poor areas. Only Kolhapur and its neighbouring states have tried to disturb the economic unity of the Krishna-Panchganga Basin. The other case is that of Goa which stands as a cultural as well as political barrier between North and South Konkan. It is obvious that this maladjustment between administrative units and geographical regions has seriously retarded the economic development of Western India and the progress of its peoples. It stands as a warning to the future administration. Efficient mobilisation of all our resources would be possible, only if the regional patterns are carefully taken into account and our administrative frame work is brought, as far as possible, in union with it. Herein lies the argument for demarcating the various parts of Western India as Planning Regions and creating Bureaus to supplement and coordinate the work of the established administrative machinery of districts and talukas.⁵

PLANNING REGIONS.⁶ The need for economic and social planning on regional basis has been increasingly felt, particularly in those areas which show considerable geographical diversity. The dangers of generalization

4. This mainly refers to the position before the States merger. It is hoped that in the creation of the Saurashtra and other administrative units in Western India, the geographical factor would not be overlooked in fixing the boundaries of the lesser administrative divisions.

5. Economic and Planning regions have received a detailed consideration in Western countries, especially Germany; R. E. Dickinson : *Regions of Germany*.

6. Planning here is used primarily in the sense of economic planning *i. e.* "the use to be made by the community of its productive resources, so as to yield the highest possible social and economic advantage to the inhabitants of any area over which the plan is to apply." (Cole: *Building and Planning* p. 39), but, it also insists that on the other, and equally important, aspect, the control of land-use, urban and rural, in the interests of the community. Regional aspect therefore is more emphasised in this outline discussion.

in survey and in laying down policy are too obvious to need any detailed reference. It is well known that man's influence over the environment in regions of lower order is ever increasing with the pace in civilization, and is seen in all the aspects of the cultural landscape he develops.⁷ Economic and social progress therefore demands more conscious planning of the regions.

The natural environment of Western India, requires a conscious adaptation to our changing needs and values.⁸ Hence the argument for an integrated planning policy for the region as a whole. The case for integrated planning is brought out into relief by a reference to the present planning measures advocated by official and semi-official agencies in Western India. It would appear that these schemes are mostly uncoordinated attempts to be undertaken as patch work in the selected areas, which were chosen mainly for their war effort and recruiting, although it is true that some areas have been selected, because of their liability to famines.⁹ It is evident, however, that uncoordinated schemes such as forestry in the Southern Division, fisheries in coastal districts, and land improvement schemes elsewhere, bear no co-relation with other aspects of economic and social life even in the selected "strategic areas." The aspect of co-relation on the fundamental basis of geography seems to have been missed.

Planning in Western India thus clearly needs a basic frame-work developed by a close study of all those geographical factors which give various parts of Western India their individuality. The two-fold purpose of regional planning, viz., (1) to secure greater efficiency in the utilization of land and all other sources of wealth, and (2) to provide conditions of good living for the villager as well as the towns-dweller must be realised in this general frame-work.¹⁰ Such frame-work can never be rigid and the

7. How important is the cultural aspect of land-use is brilliantly summarised by R. G. Stapledon: "The culture of a nation by general consent, would, I suppose, be regarded as its greatest heritage, but a heritage perhaps equally worthy of being cherished is the land surface which a nation occupies. The culture to a large extent must have been influenced by the character of the land surface, and in any event culture and land surface are interwoven, and interact in countless directions difficult to unravel." *Land Today and Tomorrow*.

8. "The adjustment of human relations to the physical and human geography of the country is still going on. It will never be complete while society is still living. Perhaps it is changing more rapidly now than in any past time of which we have record. But to-day, as a result of the advances made in science and technique, man has power to control his settlements much more fully than he had at any earlier period of his history, and so he can, if he will, make better adjustments." C. B. Fawcett: *A Residential Unit, for Town and Country Planning* p. 11. Although Prof. Fawcett refers here only to settlements, it is obvious that planned control and constant adjustment include all the features of cultural landscape.

9. *Bombay Post-war Reconstruction*.

10. Although the economic aspect of planning receives considerable attention these days, the problem of restoring human values in society cannot be neglected. "The outstanding problem of the general tangle is to find a method of restoring human, that is social values. The whole pattern of our environment needs to be reformed with this end in view.... What we need is social associations on a small scale and economic integration on large scale." E. Gut-kind: *Revolution of Environment*: p. 4. The discussion in this chapter on the planning regions mainly aims at economic integration. Social planning which includes planning of human establishments, health measures, literacy, youth movements, neighbourhood groups, should be based, in the opinion of the author, within such larger units.

planning measures within it must be sensitive to the changing conditions of the human landscape. Such planning must always start with certain assumptions regarding policy and purpose. For example, it is necessary to assume a certain national policy within which the provincial policy must play its part. Secondly, it must fit in, in the *general* environment, the *milieu* of the *local* area. A judicious combination between agriculture and forestry, industry and transport, cities and villages, evidently form the high lights of regional planning.

PLANNING REGIONS¹¹: On the basis of the foregoing considerations the following classification of the planning regions are possible:

(1) *The Bombay Metropolitan region.* A region extending up to Karjat including the Ulhas Basin and as far as Virar in the north. A region of urban and industrial development, and of highly intensive agriculture, location of industries and commercial undertakings, of administrative Offices and residential areas. The development of Greater Bombay and its satellite towns, a major consideration. Land utilisation with extreme care, especially in order to avoid overcrowding, ribbon development and haphazard growth of industries. Planning in this region must also be preceded by strategic considerations of defence in modern warfare. Industrial development of the Ulhas Basin especially along the G. I. P. route and intensive agriculture based on the tail waters of the Khopoli Hydro-electric works. Possibility of reclamation of salt flats along the Thana creek either for industrial or agricultural purposes.

(2) *The Konkan, Goa and North Kanara Coastal Lands.* A region south of Bombay up to the Provincial boundary near Bhatkal; a densely populated area, demanding development mainly in industries, since agriculture is limited by natural environment; industries related to fishing; small scale handicrafts based on cocoanut products, improvement of the local ports and development of coastal shipping, Forestry and agriculture a major consideration; re-forestation of many denuded areas, and reclaiming saline land; since this region acts as a population feeder to the Bombay Metropolitan area, improved communications both by land and sea, become important aspect in planning. Economic development of this region intimately linked up with the development of hydro-electric power from the ghats.

11. This description is necessarily a rough 'pilot' survey. A thorough regional investigation by a special agency to bring out well-integrated plans, for different areas is obviously indicated. Planning Regions, incidentally, will cut across many administrative units such as the districts and even the talukas. The 'Circle', the lowest revenue division is perhaps the most suitable, since its boundaries have a chance of approximating to geographical boundaries.

(3) *The Sahyadries.* From the region of the Dangs to the Provincial boundary in the south. A region of potential resources. A backward area having a great future; conservation and systematic promotion of monsoonal forests, a fundamental consideration, from many points of view. Forestry as expert gardening; Cultivation on an intensive scale in sugar, spices and other products in selected areas, without affecting the forest economy. Industries like the paper-pulp, matches, wood products, balanced on the forest economy; careful development of the mineral resources, like bauxite, within the frame-work of forest economy;



Fig. 68—Planning Regions.

Key: Planning Bureaus with 1. Predominantly industrial problems: 2. Problems of Forest Economy. 3. Mainly agricultural problems. 4. Industrial as well as agricultural problems, 5. Problems related to non-radic economy. For regions, see text.

development of hydro-electricity, the greatest asset of the region, providing a backbone to the industrial development in the regions on either side of the Sahyadries. An all round attempt to promote hydro-electric power, small industries, co-operative farming and public health measures, would result in populating this region.

(4) *The Poona Region.* From Lonavala in the north to the Purandhar range in the south. The basins of the Indrayani and Mula-Mutha rivers; Poona urban area a region of the diversified industry; with a future in small scale skilled industries, like the engineering, having specialised markets; development of Greater Poona on the basis of these industries; beyond Greater Poona intensive gardening both for vegetable and fruits production. The planning problems of the Poona region may be summarised as (ii) the suburban development of Poona, (iii) localisation of industries in the environs of Poona, (i) planning of the administrative offices and residential areas of the agglomeration proper.

(5) *The Godavery Valley.* Basin with Nasik as its regional focus, possibility of intensive agricultural development along the immediate flanks of the river and also in the ghat tributaries, hydro-electric developments in the Tryambuk Hills.

(6) *The Krishna-Panchganga Valley.* A fertile triangle; pre-dominance of cash crops, sugar cane and tobacco, a region of intensive agriculture, and of industrial future; Kolhapur, Sangli, commercial centres; industrial development in the minor towns—Kirkoskarwadi, Oglewadi, Bhivadi, Budhgaon and Satara; rapid growth of sugar industry during recent years; industrial progress could be accelerated with development of hydro-electric power, such as the Koyana and Radhanagari Projects; considerable scope in engineering, brassware, cotton textiles, tobacco, sugar cane and aluminium industries; good communications and labour supply.

(7) *The Belgaum-Dharwar-Hubli transitional region.* A zone of contact towns and varied agricultural and industrial development; expansion of irrigation and agriculture by improving tanks; development of industries, especially cotton textiles, brassware and vegetable oils.

(8) *The Eastern Plateau regions of Maharashtra and Karnatak:* Anti-famine measures a fundamental consideration; soil conservation, dry farming, survey to develop canal irrigation; promotion of rural industries as an anti-famine measure; vegetable oil, cotton textiles and leather, in selected areas. (8a) Industrial development in Sholapur, Bagalkot.

(9) *The Tapti Valley:* Khandesh and the Surat estuarine region; agricultural problems almost similar to those in (8). Predominance of cotton cultivation; Soil conservation on the Tapti flanks. Further development of the cotton textile industry; (9a) possibility of agricultural development in the wetter and unhealthy regions of the Satpuras; and the West Khandesh; the need to evolve a better forest economy in the highland zones of this region; (9b) Surat plain, soil erosion and Tapti floods. Development of communications, both east-west, north-south has made Surat a great centre. Planning in agriculture relates to better soil con-

servation and land use. Surat and its satellites, progressive industrial towns, where planned development to avoid slums; necessary improvement of port facilities along the coast line.

(10) *Southern and Central Gujarat Plain.* Region drained by the the Narbada and Mahi rivers, agricultural problems similar to those in the Surat plain. Although in the Charotar region it reaches an extraordinarily skilled development; promotion of agricultural industries like the cattle breeding and dairying, possibility of developing the fertile region of the highland arc in the north-east. Industrial development based on local minerals in the highland region and on the agricultural projects in the plain tract. Baroda, Nadiad, Anand, growing urban centres; the need to improve the ports of Broach and Cambay.

(11) *The North Gujarat and Kathiawar Region.* A region from the Sabarmati to Palanpur in the north; drier region than (10); agricultural panning based on anti-famine measures. Cotton a leading crop. Ahmedabad the industrial and administrative nucleus. Re-planning of the Ahmedabad conurbation planned growth of other centres, such as Kapadwanj and Viramgam.

(12) *Kathiawar highlands and north-eastern Gujarat highlands.* Afforestation, planned development of the grass land regions; cattle breeding.

(13) *Sorath low-lands.* Better drainage in the Nal and Gher regions; development of ports, communications; better administrative co-ordination.

(14) *The Okha region.* A region specialised in cement, chemicals; development of Okha port, prospects in industrial progress with the development of land communications by the removal of customs barrier.

(15) *The Gulf of Cutch region.* Planning more related to the narrow strip along the coast line; improvement of ports in the interior, development in dry farming; possibilities of leather and chemical industries.

THE ADMINISTRATIVE ASPECTS. Clearly such planning regions are based upon a frame-work of administration to survey critically the problems in each region; to chalk out the details of policy in each of these regions and supervise the policy implemented by various government departments. A separate branch of administration such as a Planning Authority is thus necessary with co-ordinating branches in each of these regions. This administrative frame-work clearly cuts across the administrative divisions of the provinces such as the districts and the talukas. It forms a scrutinising body with its limits almost identical with the geographical limits of each region. Thus at least five Planning Bureaus of this type could be created.

PLANNING BUREAUS. (Fig. 68)

1. Mainly industrial problems; location of industries; planned urban development. All the major cities and towns come in this category.

2. Dealing with Forest Economy; conservation and scientific development of forests; control of land under cultivation such as the Spice gardens or Sugar cane; planning of grassland areas; promotion of the human factor through coordinated settlements, health measures, literacy etc. The Sahyadries, the Satpuras, the north-east highlands of Gujarat and the Girnars, have almost identical problems.

3. Dealing with intensive agriculture, and partly with new industrial development in textiles, sugar, vegetable oils etc. Planning based essentially on agricultural development and the welfare of the rural population; industry as an important auxiliary. All the rich agricultural regions belonging to this group.

4. Agriculture and industry have almost an equal importance in economic life. The Charotar and the upper Krishna valley are the two leading regions where an intimate relationship between agriculture and industry is necessary.

5. Problems mainly related to rough grazing, dry farming, and the nomadic population, in the arid north-west.

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CHAPTER XV

Forces that divide and unite Western India.

Having surveyed the regional, economic and administrative characteristics of Western India, it is now possible to review the leading contrasts and similarities which go to make up the personality of the region. Our regional survey has already shown the many features of contrast that threaten the disruption of the region.

FORCES THAT DIVIDE WESTERN INDIA. (a) Political past and present. Our study of the political history indicates that Western India received a variety of influences in the past. So deep has been the impression of the political events, that till recently, it seemed as though they would leave an indelible mark by way of the States territories, haphazardly spread over economic regions. The States as independent administrations were a disruptive element in the region. And yet in spite of the merger of the States, there exist even now different foci of culture and heritage, which are capable of mustering local sentiment for a local cause. This can be well seen from a regional study of the capitals in the ancient and medieval periods. Junagad, Vala, Patan in Kathiawar, Kalyan, Junnar, Karad, Kolhapur in Maharashtra, Badami, Halasi, in Bombay Karnatak were centres of administration in the ancient period. Under the Muslim rule, Ahmedabad, Ahmadnagar and Bijapur rose to prominence. Their political importance was taken, in the Maratha days, by Satara, Poona and Baroda. During each period in history, these local capitals rallied round themselves the loyalties of their neighbourhood, fought with each other and denied themselves a chance of unity. It must be noted however that in each succeeding period in history, the new capitals wielded a much longer influence and claimed a wider allegiance than its predecessor. Thus Poona of the Maratha days brought greater unity than Karad or Kolhapur in the Hindu period. The rise of Bombay proves again this general tendency of the widening influence of the capitals. In true line of succession, Bombay is the creation of the British rule and commands an allegiance which spreads beyond Western India. It is no wonder then that the political and cultural life of the province was influenced by the capitals each in its own way leaving an impression on its surroundings, and creating two opposing tendencies in Western India. The modern large cities throwing their influence over larger areas at the expense of the

small historical towns, and the smaller towns trying to preserve their individuality by resisting such encroachment by their modern rivals.

(b) *Different patterns in religion.* Influence of religions has introduced a second force that has prevented homogeneity in the past, although happily no single religion has shown a *regional consciousness* that it may threaten the unity of the inhabitants, on the scale it has done between the Pakistan and the rest of India. In the early stages, Buddhism in north and Brahmanism from the south claimed loyalty of the people. Jainism, later made its appearance and became a force in Kathiawar and Gujarat, leaving small 'islands' in Maharashtra and Karnatak. Then came the cross currents of the Muslim invasions and Mohammedanism, first under the Bahamanis from the east and south-east, and later under the Moguls, directly from the north, in Gujarat and Kathiawar. While Islam was more interested in political conquests, in this medieval age, Hinduism true to its flexible character underwent many minor changes, of which Veershaivism in Karnatak and Vaishnavism in Gujarat gathered good momentum. It is fortunate that no religion or any particular sect within it, has claimed a total allegiance of the people of an area or a part of it, such as Maharashtra or Bombay Karnatak. But it does not mean that they have left no impression on the cultural landscape. The valleys of sacred rivers like the Narbada, Godavery and Krishna, the holy cities on their banks like Nasik and Wai, the centres of pilgrimage like Somnath, Alandi and Pandharpur, are the living monuments of Hinduism. Cities like Palitana in Kathiawar reflect the spirit of Jainism. Islam, unlike the Hinduism, has largely left its impressions, in fortified townships and ports, as is evident from the urban structure of Ahmedabad and Bijapur. Bhatkal in N. Kanara is an "Island" of Muslim religion and culture. And has Christianity lagged behind? The landscape of Goa is eminently Christian. Bassein not far from the Metropolis of Bombay is still 'Catholic' in its setting! What then is the significance of these religious patterns from the larger point of view of the unity of Western India? It is this. It prevented unity in the past, when religion swayed the passions of people. In its diversity, it now lends colour to human life.

(c) *Differences in language.* If languages form a major vehicle of culture, our linguistic differences must be called yet another force that divide the people of Western India. Its significance lies in that each linguistic type weaves a social pattern around itself. The Indo-Aryan and the Dravidian languages in their geographical setting have given rise to many local patterns, each having its regional focus and distinctive characters. There are three major languages spoken by the peoples of Western India. Foremost comes Marathi which is spoken by over

one third of the total population of Western India. The Bhima and the Godavery basins are the home of the Marathi language although its extension has taken place upto the Thana district in the north, and the N. Kanara and Belgaum districts in the south; Eastwards the language claims an allegiance, far beyond the provincial boundary, in the Berars, and the Marathawada part of the Nizam's State. Next, from the point of view of numbers, comes Gujarathi, spoken by over 15 millions. From the regional centres of Ahmedabad and Baroda the influence of the language spreads over Kathiawar and over the Gujarat plain as far south as the Thana district. Kannada the third major language of the province is almost entirely restricted to its southern districts. Although this is the general geographical distribution of the principal languages of the province, their territorial boundaries are not only difficult to draw, but have become a political issue between contesting forces. These are the much disputed areas where bilingualism is common to a surprising degree. Secondly, these borderlands between the principal languages are also transitional belts where many dialects are prevalent. With the rise of regional consciousness in Gujarat, Maharashtra and Karnatak, these bilingual belts have suddenly come into the lime light and have acquired a political importance.

Thus history, religion and language have cumulatively created at least three areas of regional consciousness, in Western India. Historical background, the teachings of the religious leaders and the linguistic bond have promoted, rather regenerated, the regional culture of Gujarat, Maharashtra and Karnatak. It would be wrong to suppose that these are in any way a new development in Western India. These are undoubtedly the new patterns of the earlier culture that was Gujarat, Maharashtra and Karnatak, before these territories were forged into a common administration by the British rule. It is mainly the basis and the environment of the awakening that is new. This new regional consciousness that insists on the cultural province is an outcome of the stability and social progress of the last century and the political maturity of the inhabitants.

Gujarat thus finds its cultural expression in its language and the teachings of religions and social leaders with a definite learnings towards Vaishnavite philosophy. Religious centres like Somnath, seats of ancient culture such as Valabhi and Patan, and modern agglomerations of Ahmedabad, Baroda, Bhavnagar and Surat, draw the people closer towards common cultural and social aspirations. A growing regional consciousness may be seen through the evolution of institutions like the Gujarat Research Institute. Economic interests similarly find a unity of aim in new associations. A similar cultural setting now exists in Maharashtra and Bombay Karnatak. Marathi language and literature is the basic tie that unites the people of Maharashtra. Dnyaneshwar, Ramdas

and Tukaram are a common source of inspiration and devotion. In the new awakening that has come in the wake of the British rule, the mind of the masses cherishes the glories of their recent past. Their political hold not only over Maharashtra and Karnatak, but in Central India and the north, is an achievement of very recent history, and still continues to exist on the cultural landscape of the conquered regions, through the Marathi States, the Maharashtrian population and the Marathi language. Thus Baroda is an "island" of Maharashtra culture; Indore and Gwalior are its northern counterparts. The cultural region of Maharashtra however differs from others in Western India in several ways. First, it is the largest in size and population. Secondly, while the Gujarat cultural region lies practically within Western India, quite a substantial portion of the Maharashtra cultural region forms part of the C.P. Berars and the Nizam's State. On the other hand, there is a contrast with Bombay Karnatak. Bombay Karnatak is now a borderland whose cultural focus, it may be said, has migrated to the Bangalore and Mysore region the central territories of "United Karnatak." The cultural core of Maharashtra on the other hand belongs to Western India and it is the borderland which belong to other administrative units. The cultural conflict and regional awakening is more acute in Bombay Karnatak than in the other two groups, quite naturally because of the Dravidian influence, in its language and culture. It has a greater allegiance to Mysore and other Kannda speaking parts of the Deccan Peninsula. The people therefore share a common ideal of undoing the political fragmentation that followed the British rule and creating a "United Karnatak." It is this cultural conflict between the three leading zones of Western India that constitutes a danger to the unity of Western India.

FORCES THAT UNITE WESTERN INDIA. While regionalism is playing a very active part in Indian politics today, and the unification movements in Gujarat, Maharashtra and Karnatak have gathered a good following, it is not possible to miss the leading forces which have contributed to the unity of the region. In spite of the several local differences, some of them basic and others superficial, it cannot be denied that natural and human factors have contributed more to its unity than disintegration.

✓(a) *Orientation to the Arabian Sea.* The very orientation towards the Arabian Sea have made contact between the north and south regions intimate. The gulfs of Cutch and Cambay, have added to the coastline and the relief in the Kathiawar Peninsula, the Gujarat plain and the Konkan strip, have brought nearly half the area of Western India under the influence of the Arabian Sea. Where Nature has denied easy access, man has improved upon her ways. The Sahyadries, in the past, were crossed at several gaps, and modern roads and railways, focussing on Bombay, have drawn the plateau regions closer to the coast

fine. The Arabian sea thus has not only created contacts between Western India and Africa, but has facilitated through the 'coastal arc', the economic and cultural development of the littoral regions.

(b) *Bombay.* Of a greater significance, now, is the influence of the economic factor. The growth of Bombay represents this dynamic aspect of Western India. To what extent does Bombay hold the key to economic progress of the region can be seen from its position in finance and industry. Bombay is the chief banking centre of India. 'High' finance has been its speciality, and much of the industrial and almost the whole of the commercial development of Western India is due to the facilities that Bombay offers to its various parts. Commerce of Bombay, owing to its advantages as a port and centre of finance, has brought the distant parts of Kathiawar and Karnatak in close touch with the metropolis. Export of cotton, oil seeds and other produce of the agricultural interior, and the foreign imports mainly consisting of manufactured goods which find their way to these rural areas, are the main avenues of economic contact between Bombay and the rest of Western India. The 'City', the 'Cotton Green', the oil installations, the grain depots of the metropolitan region are the manifestations of its commercial influence. The development of roads and railways and its present pattern which makes Bombay its nerve centre, have further tightened this economic hold over the hinterland. To this must be added Bombay's industrial development. The industrial landscape of the Bombay Island is clearly not a creation of the Island alone. Almost all parts of Western India have contributed to its success. The industry owes much to the finance from Gujarat, raw materials from all the cotton growing tracts, labour supply from Konkan and the Maharashtra plateau, and hydro-electric power from the Maharashtra Sahyadries. The Bombay Industry has a two fold significance in the human geography of Western India. It creates a unity in economic interests by causing a steady flow of industrial labour from the rural areas to the city; it also sells its products to these areas. Thus through port facilities, finance, industry, communications, industrial labour and markets, the city creates an economic unity over the whole region.

(c) *Pattern of communications.* The means of communications and their present day pattern have considerably helped to forge this economic and regional unity. The B. B. C. I. route and its branch lines have brought Bombay and the cities of Gujarat and Kathiawar close together. The valley routes of the G. I. P. and the M. S. M. Ry. over the plateau, have in the same way broken the old isolation. The Konkan strip similarly is easily accessible by the coasting routes. The significance of this development in transport does not merely lie in its breaking the economic isolation of the interior. It has accelerated the urban growth; it has

promoted social and cultural contact between peoples of Gujarat, Maharashtra and Karnatak. It has facilitated exchange of ideas among the people and given them, inspite of themselves, a new outlook. Even the isolationist who demands a separate province unconsciously realises the economic and cultural inter-dependence of the various parts of Western India. To what extent the transport creates and maintains this unity may be statistically gauged if a survey is made of the number of train services that are provided between various cities of Western India, and the volume of passenger and goods traffic that flows from the interior to the commercial centres, and from these, to Bombay. It is not unsafe to say that the *inter-regional* flow is considerably greater than the flow between Western India and the rest of India. It is easy to realise, finally, that this unity developed by transport is still in process. The region awaits planning of roads in the interior and the development of nationalised road transport.

(d) *The Administrative Pattern.* The administrative pattern has similarly shown a centripetal tendency. Excepting Kathiawar and Cutch, all the administrative units were under the control of the Bombay Government for a long period. Baroda seceded from it in 18 when its relations with the Central Government were arranged through an independent Political Agent. The administration of the Gujarat and the Deccan States till 1935 was supervised by the Centre through the Provincial Government. The period of 1935-1947 showed a disrupting tendency when the States administration was placed under the direct control of the Political Department. But can it not be said now that the geographical factors are again by way of asserting themselves, with the Independence and the political awakening of the States people, in the merger of the States?

(e) *Psychological Bond.* A common administration over a long period, and an economic development in which the town and the countryside have made a joint contribution, have created psychological bond that unites, consciously or unconsciously, the peoples of Western India. The University of Bombay through its affiliated colleges has evolved a common pattern in higher education and shaped a common outlook in the educated classes. Political education similarly has flowed out from a common experience. The Congress as well as the Liberals in their infancy shared a regional consciousness that they belonged to Western India. The Press similarly evinces a regional consciousness in that it spreads its primary interests over the happenings in Western India. It would be an interesting study to review the administrative divisions of commercial firms and other public associations. It is very probable that almost all public associations for the efficient administration of their functions like the oil companies and the textile

associations have divided their territories on the basis of Western India.

Orientation towards the Arabian Sea, Bombay, industrial and commercial development, pattern of communications public opinion moulded by a common University and Press, common administration over the major portion, have thus given Western India its geographical personality, that distinguishes this region from the Rajputana and Malwa to its north and north-east, from the C. P. and the Nizam's State to its east, and from the Madras and Mysore territories in the south.

AT THE CROSS ROADS. While the present geographical individuality of Western India has been emphasised in this regional survey, it is not suggested that no change which would fundamentally alter the space-relations is taking place. It would almost amount to challenging the fundamental concept in human geography regarding the everchanging relationship between man and his environment. It is indeed this constant adjustment that endows the region with its individuality. The recent political development shows a more vigorous attempt than before to influence the human geography of the region. The demand for a linguistic (or cultural) redistribution of the Indian Provinces finds its ardent support in all the cultural regions of Western India. The Kathiawar Peninsula has now been consolidated into the new Saurashtra Province. Although the popular inspiration comes from Bombay and its government largely manned by the Bombay Government, it is not yet clear whether Saurashtra would be an independent province. The public opinion in Gujarat argues for the unification of the provincial districts, the merged States, and Baroda, to create a 'Maha-Gujarat.' The Maharashtrians similarly would like to have a province which would include all the Marathi speaking areas within and without the province. The Bombay Karnatak aspires for its unification with the Karnatak areas of the south.

The main support to this new regionalism is drawn from linguistic affinities, and since cultural characteristics are notoriously difficult to define, the argument for creating the new cultural provinces mainly rests on language. It must be noted that there is also a second reason for this demand: the distance from the Provincial Capital and the neglect, according to some, by the Government, of the needs of the far flung districts. The growing response of the Bombay Government to the demands of the people as seen from the proposed creation of regional universities, and the devolution of administration to suit the local public opinion, have given a further stimulus to this movement, and has resulted in the appointment of a commission by the Constituent Assembly.

It is thus possible for man to undo the fusion of those forces which have created Western India. While human passions are running

towards separatism, it is relevant for the geographer to insist upon its regional aspect and point out two sets of problems that would arise in a new orientation. The first relates to the boundaries: (a) If the boundaries are going to be linguistic, bilingualism, at least between Maharashtra and Karnatak, forms a broad belt instead of a line. (b) The "islands" of Maharashtra culture in Karnatak and Gujarat. (c) possibility of the boundaries of economic regions to be completely overlooked. The second set of problems belong to the desirability or otherwise of an entirely new provincial alignment: (a) the proposed provinces will in all probability break the present economic pattern of Western India and retard their own development; (b) the administrative status of the Bombay City. Will it be a part of a new province or an independent region, in which case, what will be its industrial and commercial structure?

Yet, human relations do not always go by the desirability of a particular course of action. As Vidal de la Blache points out, although the physical environment can bear heavily on the possibilities of man, there is always more than one possibility, and that this choice "is not so much a matter of crude interest as a matter of rite, of breeding, and of sentiment."¹ Sentiment probably plays a far more significant part in human geography than hitherto suspected. As Alix insists, Modern ideologies as a causal factor are as important as the physical environment and social institutions. In the context of the regionalism in Western India it could be said that the demand for a completely new set-up of the Indian Provinces on cultural basis, shows the possibilities of its being accomplished regardless of the economic and political consequences which such a 'repartitioning' of India may bring in its wake. The physical environment as moulded by the human factor during the British rule, hardly seems to warrant it. It is probably outside the scope of this regional study to enlarge upon the significance of this scheme from the point of view of the political unity of the country. It is however permissible for a student of geography to observe that in Western India regional conditions permit of a happy mean between the extremes of centralised control from Bombay and a completely new realignment. While the

1. A. Alix: "Man in Human Geography," Scottish Geographical Magazine; Vol. 64, No. 1, p. 7. He further emphasises "Modern geography could well study, not less than environment and ancient rites, the modern ideologies as a caused factors..... But let us leave aside nationalism and fanaticisms and all kinds of prejudices and even displaced persons although they are a very large part indeed of the present geography of man. It is another story and yet, the same story: Man, always man, and the passion of man. Let us only remark that any boundary, with all its geographical implications, of races, language, morals, customs, money, domestic production, trade and standards of living, is the work of man alone. It is always drawn upon some kind of agreement between man...."

popular demand for cultural provinces is mainly based on sentiment and language, the *new* regional consciousness in Gujarat, Maharashtra and Karnatak is not the *outcome* of sentiment and language alone. Not merely the historical appeal, but new forces like mass education, political awakening after the Western pattern, economic development, urban growth, that have contributed to the emergence of this new regional consciousness. It is essentially a new outlook of the inhabitants which radically differs from their past. The 'Bombay' Maharashtra, by virtue of its modern setting, cannot be a part of the historical Maharashtra. Nor is it an artificial fragment of the Greater Maharashtra of the present. It is quite distinct from the Marathi speaking areas of India. It is a regional entity in itself. So is 'Bombay' Karnatak which has many features of contrast from the neighbouring Karnatak regions. How much is in common between Bombay Karnatak and North Mysore in physical environment? The Sahyadries, and the dry agrarian plateau run through Maharashtra, Bombay Karnatak and Mysore. The economic development of Bombay Karnatak is more influenced by the Bombay City than by Bangalore. The regional consciousness, and this is a fundamental test, of the people of Bombay Karnatak is moulded neither by Bombay nor Bangalore but by its own towns, notably by Dharwar, Hubli and Belgaum. The demand for administrative urban and social centralisation round about Dharwar and Hubli is the legitimate result of this regionalism. It is this psychological tie which creates regional consciousness, centres round Dharwar-Hubli as the capital of Bombay Karnatak, although the issue of creating Bombay Karnatak alone as a separate province is, on the political plane, much mixed up with the movement for unification of all the Kannada speaking areas. It is evident that it is as units of Western India, that these cultural regions have acquired their distinctive features. These sub-regions of Western India represent the new adjustment between the natural, administrative and economic forces in human relations, on one hand, and linguistic and cultural, on the other. But they amply prove the basic fact, in human geography, that it is neither religion, nor language, but the space *i. e.* the surface, that governs the human life. This new adjustment which seeks its expression through regional consciousness in Gujarat, Maharashtra and Karnatak can be modified, although it cannot possibly withstand a complete alteration by separating the provinces.² Would it not be better therefore to recognise these regions

2. "A nation, a province and a city are great and fragile masterpieces of human geography. Their equilibrium is unstable to the very extent to which men have increased the number of unavoidable connections with the natural environment. The necessity of maintaining this equilibrium at any cost strengthens the bonds that attach a given group to a given place." Brunhes : p. 617. 'The unstable equilibrium in Western India may find a new adjustment either by creating sub-regional administrations within the province or by the creations of new linguistic provinces as units of India. The possibilities in man's choice, as Vidal de la Blache warns, are governed more by his passions than by physical environment.'

as sub-provincial administrative units, with devolution of powers relating mainly to policy and expenditure, within the larger of framework of the Provincial Government, an arrangement that would meet the aspirations of the people as well as preserve the economic and regional balance of Western India?

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256	3	38 millions	32 millions
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267	14	will seen	well seen
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275	35	alteratation	alteration
276	2	of framework	framework

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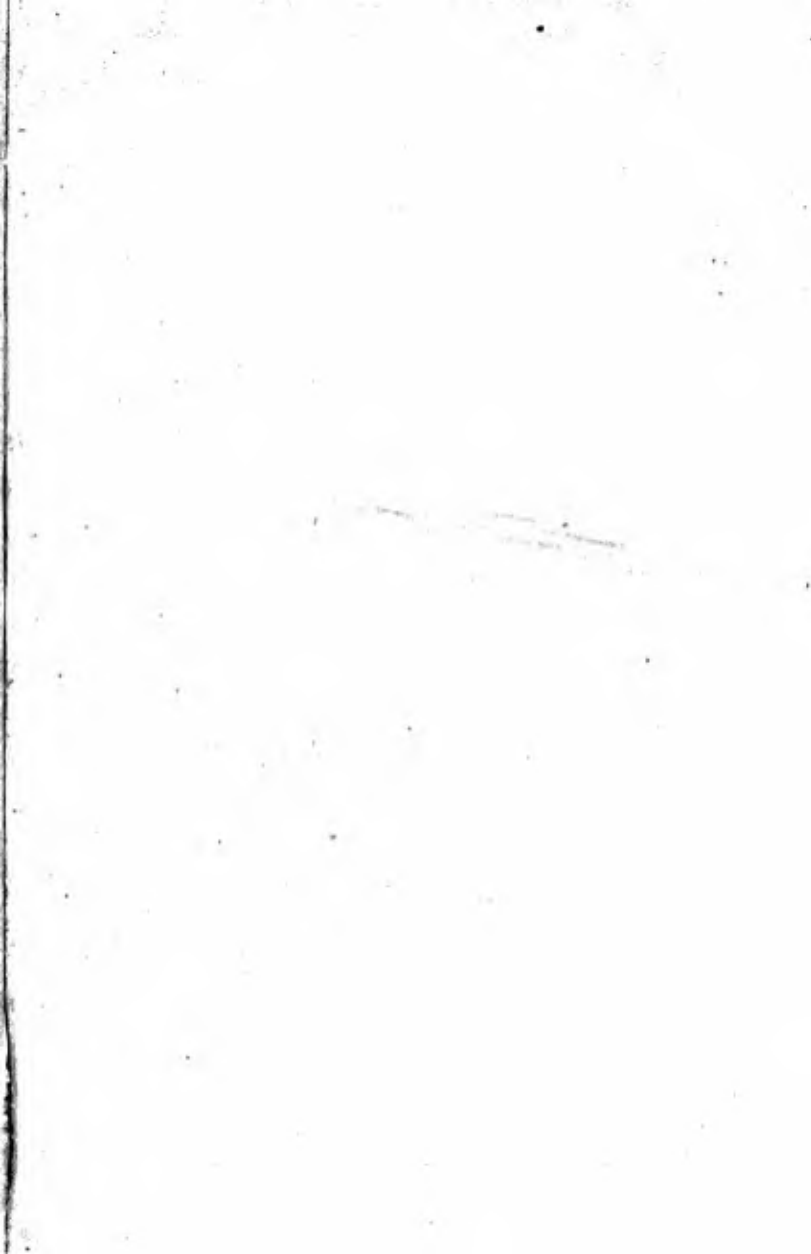
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